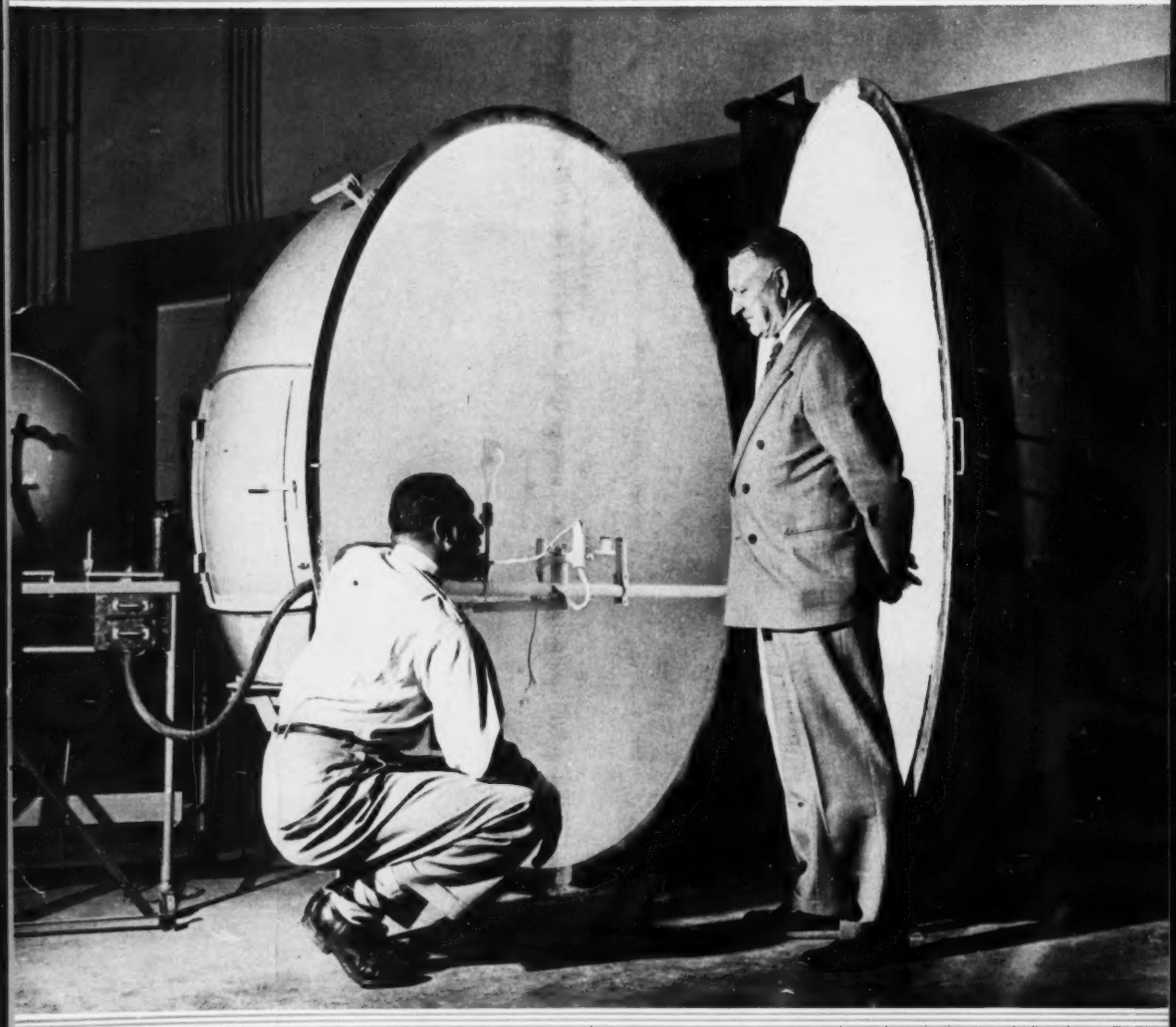
ELECTRICAL WEST

Part 1

April 1951
50 Cents



Manufacturers' Directory Issue

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

POWER POINTER
you get big results by sticking to business!
Anyone who says that some jobs are "too big" for private business just hasn't looked at the record. Take the electric industry—owned by millions of private individuals in all walks of life. It has raised our standard of living to the highest in the world, added comfort and convenience to practically every home and brought countless benefits to industry. What is more, it has always employed efficient, businesslike methods. That's why production and use of electricity have gone up, rates have gone down.
"Edison electricity is your best buy—you can depend on it!"
SOUTHERN CALIFORNIA EDISON COMPANY

POWER POINTER
America grew power-full by being American!
That is to say, our nation became the greatest producer and user of electric power in the American way, by leaving the job to the business-managed electric companies. By pioneering, by constant research and development and by efficient operation, these companies have provided Americans everywhere with the best electric service in the world, at very low rates and without red tape, delays or additional cost to taxpayers!
"Edison electricity is your best buy—you can depend on it!"
SOUTHERN CALIFORNIA EDISON COMPANY

private enterprise can do big jobs, too!
And you don't have to go very far to see proof. Up at Big Creek there's one of the world's greatest hydroelectric developments, the Edison project. It represents an investment of $142,000,000, and was conceived, planned and built in the good old-fashioned American way—by a business-managed company working for better service to its customers.
"Edison electricity is your best buy—you can depend on it!"
SOUTHERN CALIFORNIA EDISON COMPANY

Pointing toward Profits!

All Edison advertisements do not have electrical merchandise as their subject. Some are what the trade terms "institutional"—the ones shown here, for example.

Whatever you call them, they're selling something, too!

Something important? Yes, we think it's an important part of our selling job. We devote a part of our advertising to it every year.

You could put it this way: Some Edison advertisements sell electrical appliances. Others sell the American way of life. Either way, they sell better living.

There's a difference in the advertisements—certainly there is. One kind helps dealers sell appliances. The other may not make cash registers ring, but dealers profit nonetheless—along with everyone else!

Edison

SOUTHERN CALIFORNIA EDISON COMPANY

Electric Utilities step up trend to RM * transformers

let's check this

1950 purchases of RM units up nearly 81% over 1949. Need for faster shipment, flexibility, seen as basic factors

Last year, 77 different electric utilities saved an average of 4 weeks in delivery time and 8 per cent in purchase price per transformer by specifying General Electric's RM power transformers. Their total 1950 buying resulted in an 80.6% increase in orders for standardized units.

This year, too, vital time can be saved. Right now, RM shipments are from 5 weeks to 5 months shorter, and prices are 8 per cent lower than for nonstandard units of similar ratings.

Are you *sure* you realize *how much* flexibility in application you can obtain and still qualify for RM savings? "Loadability" and voltage ratios, for example, are worth checking again—particularly with the need for faster delivery being what it is.

General Electric Company, Schenectady 5, N. Y.

* **"RM"** stands for Repetitive Manufacture and covers General Electric's standardized power transformers up to 10,000 kva. You can obtain many optional features—including primary voltages—and still qualify for RM price. Special engineering is eliminated on RM transformers. As a result, prices are lower, deliveries are shorter. Booklet GEC-479 contains full information.

GENERAL ELECTRIC

401-11

With Factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities

APRIL 1951

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-third year of publication

VOL. 106
NO. 4

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Assistant Editor — John Cootz, Typography

Next Month

Two timely engineering articles will appear in the May issue. One describes a brand new type of aluminum conductor for service wires and secondary runs. It consists of two synthetic-insulated aluminum conductors twisted with a bare neutral. Portland General Electric Co. is using it extensively.

The other deals with the problem of locating defective splices in ASCR conductor on 230-kv lines. Southern California Edison Co. has come up with a thermometer carrying cradle for measuring temperature between splice and adjacent conductor.

Again this year there will be the timely article giving results of the government's snow survey and forecasting water conditions for the West.

For those interested in rewiring for better lighting there will be pictures and description of a San Diego job using metal molding to solve the wiring problem on a solid concrete ceiling.

The Power for Defense program is getting under way in the West. A summary will be given showing what various chapters of NECA have done in this movement.

Association-wise there will be reports of several important meetings. Included will be the Northwest Public Power Assn., RMEL, and Inspector's meetings.

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Cover photo: A 7-ft sphere for photometric measurements in new UC electrical engineering laboratory

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Cleveland (5) . . . . . Frank J. Seiler, 1510 Hanna Bldg.
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New York (18) . . . . . Walter Klein, 330 W. 42nd St.
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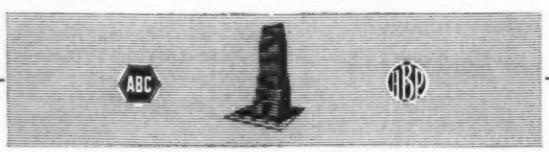

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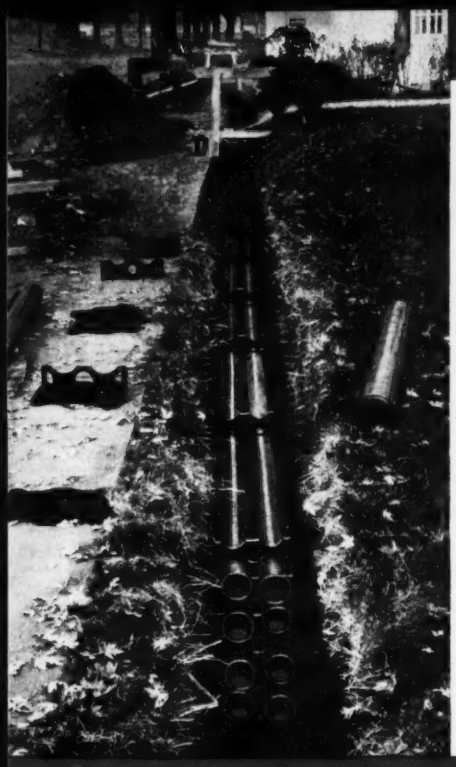


for faster underground installations

New L-M Spacers

New L-M Base Spacer:

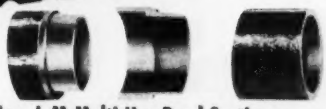
assures rigid foundation, desired gradient. Interlocking ends; wide flat base—the spacer will not tip over during or after installation. All L-M spacers come in standardized cartons to save stockroom handling and space. Available from stock, in six standard sizes.

New L-M Intermediate Spacer:

made of asphalt and asbestos fibre, highly resistant to acids and alkalis, fire resistant, Underwriters' listed. Withstands vertical flat crushing test of over 1200 pounds. Grooved ends lock together with the next spacer; centers notched for sawing.

New L-M Bend Spacer Bar:

a duct-installation leveller, used horizontally or vertically for accurate alignment of conduit around bends. Saves hours of work in lining up. Offers a tremendous saving in installation labor costs. L-M exclusive. 20" long, 1½" square, easily sawed to length.



New L-M Multi-Use Bend Sections and Angle Couplings:

use in any combination to make all kinds of special bends and crossovers. Male and female tapers offset 2½°, giving 5° bend in each section. Smooth inside, watertight tap-tite joints.

The L-M System makes Fibre Conduit *so easy to use*

New L-M Fibre Conduit Vise

An easy, safe way to hold fibre conduit for sawing or tapering. For mounting on truck or bench, or with detachable tripod for use in the field, on the job.

With L-M Fibre Conduit and L-M equipment and tools, L-M's system speeds up underground installations, makes better jobs.

L-M Fibre Conduit is strong, light, tough; yet it's easy to taper and cut to length. L-M base spacers, intermediate spacers, and bend spacers assure a firm foundation and a rigid structure that won't settle or shift.

L-M tools save hours of time in the shop and on the job. Better get the low-down on this high-class, time-saving equipment.

GET THIS FREE HANDBOOK! Pocket-size manual covers recommended underground construction practices; contains valuable reference tables. Ask the L-M Field Engineer for a copy, also for new Fibre Conduit folder; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

New L-M Tapering Tool

Cuts a precise 2° taper on the end of conduit to assure tight, snug joints. Light; easy to use; saves time; cuts costs by salvaging cut ends and short lengths quickly.

LINE MATERIAL... Fibre Conduit

Complete Coordinated Equipment for Distribution Today

Yesterday, corroded and costly!

So . . .

Corrosion is common wherever iron and steel are exposed to the elements. But not so many years ago, it was a particularly costly problem to the electrical industry. In those days electrical wiring systems often required additional wires to carry the constantly increasing power load. Ordinarily, the new wires would be fished through the conduit. But frequently the conduit was rusted through, making fishing impossible and necessitating a new conduit installation. This was troublesome, time-consuming and above all, expensive—especially when it involved ripping out building walls to replace the corroded conduit buried therein. Obviously, someone had to put *permanence* in wiring.

PIONEERING IS SIMPLY DOING THE OBVIOUS FIRST

conduit was common

SHERARDUCT

RIGID STEEL CONDUIT

came into existence

National Electric Products Corporation realized there were many ways to fight corrosion —by painting, by introducing alloying elements into steel, by galvanizing. There was also *sherardizing,* a dry galvanizing process of alloying zinc dust to metal under heat, thereby providing a permanent protection against rust. Although the process was tricky and difficult, NE sherardized its conduit—called it Sherarduct—and solved the costly problem of corroded conduit!

For more than 40 years, Sherarduct has meant *permanence in wiring*—the *quality* conduit that "will last as long as the building stands." And for as many years National Electric has stood for "everything in wiring" —the world's largest producer of *the complete line* of secondary electrical distribution systems.

RIGID CONDUIT SYSTEMS

FLEXIBLE CONDUIT SYSTEMS

ARMORED CABLE SYSTEMS

NON-METALLIC SHEATHED CABLE SYSTEMS

SURFACE RACEWAY SYSTEMS

INDUSTRIAL BUSWAY SYSTEMS

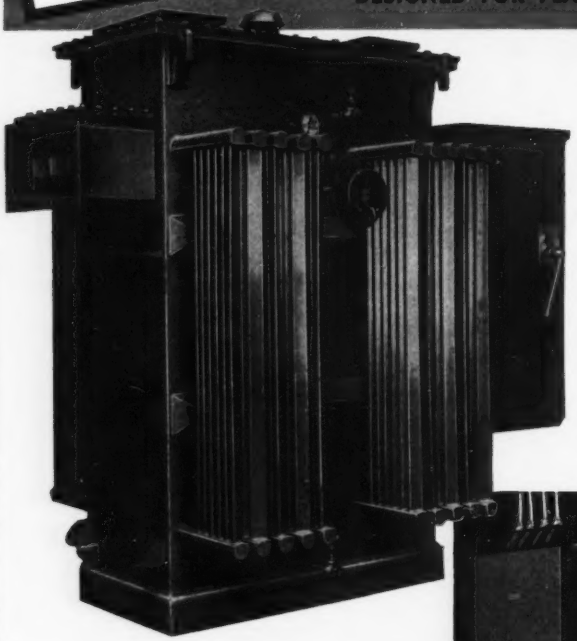
BOXES, CONNECTORS AND FITTINGS FOR EVERY NEED

EVERYTHING IN WIRING POINTS TO

National Electric
PRODUCTS CORPORATION
1300 CHAMBER OF COMMERCE BLDG., PITTSBURGH 19, PA.

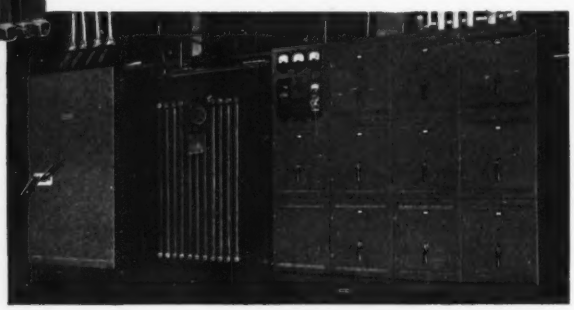
Wagner®
TRANSFORMERS
... the choice of leaders in industry

Wagner
UNIT SUBSTATION TRANSFORMERS
DESIGNED FOR PLANT POWER DISTRIBUTION SYSTEMS

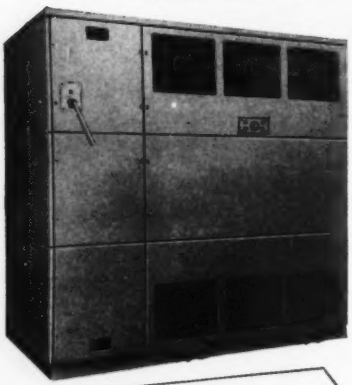


The ever-increasing demand for electric energy to power today's stepped-up production presents a critical problem. The answer to this problem has been found in load-center power distribution systems. The vital part of the load-center system is the transformer. If a switch or circuit breaker fails, only a part of the system is affected—but if the transformer fails, the entire system is dead.

Wagner Unit Substation Transformers assure a continuous, dependable flow of power. They are carefully designed to meet your distribution requirements, and are available with various types of entrances and controls for the high-voltage circuits, and with proper throats on the secondary side to connect to any make of switchgear, in the usual range of ratings up to 2000 kva.



Wagner-equipped unit substation in a synthetic textile plant.



Dry-Type Indoor Transformers

Wagner now furnishes three-phase dry-type transformers in ratings up to 2000 kva in the 15 kv class and below. These units are compactly housed in neat, attractive enclosures, which can be arranged to include primary and secondary switchgear compartments to form readily accessible, closely-coupled unit substations. Relatively light in weight, so that they can be used in multi-story buildings, they are readily adaptable to any installation requirement.

WAGNER ELECTRIC CORPORATION
6381 Plymouth Ave., St. Louis 14, Mo., U.S.A.

Wagner Electric Corporation
1891 WE 1951

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

TN-4

NEW JOINT REINFORCING SLEEVE

OKOMETAL TAPERED
LEAD REINFORCEMENT
USED IN GARRISON JOINT

TRIPLES LIFE OF POWER CABLES

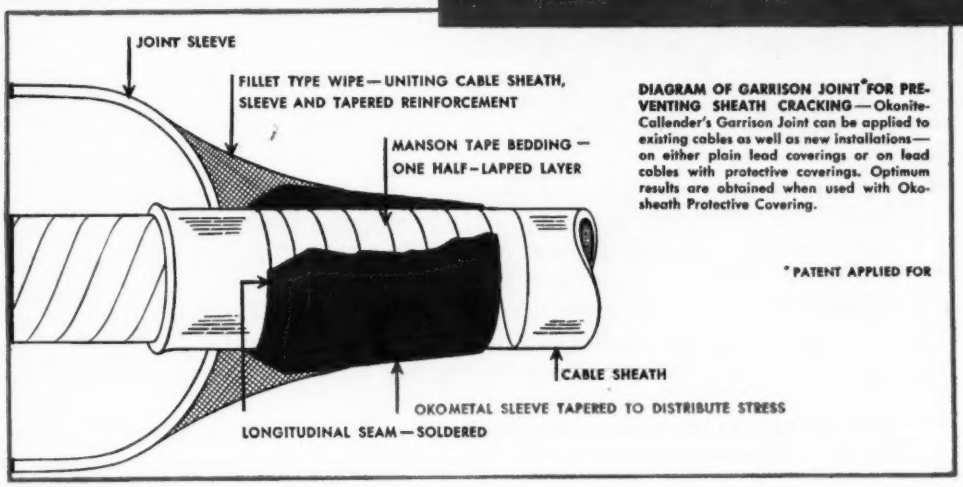

JOINT SLEEVE
FILLET TYPE WIPE—UNITING CABLE SHEATH, SLEEVE AND TAPERED REINFORCEMENT
MANSON TAPE BEDDING — ONE HALF-LAPPED LAYER
CABLE SHEATH
OKOMETAL SLEEVE TAPERED TO DISTRIBUTE STRESS
LONGITUDINAL SEAM—SOLDERED

DIAGRAM OF GARRISON JOINT* FOR PREVENTING SHEATH CRACKING—Okonite-Callender's Garrison Joint can be applied to existing cables as well as new installations—on either plain lead coverings or on lead cables with protective coverings. Optimum results are obtained when used with Okosheath Protective Covering.

* PATENT APPLIED FOR

A major cause of paper insulated power cable failure is cracking of the lead sheath at joints, due to cyclic bending in manholes. Main source of this trouble is the concentration of stress at the joint wipe.

Okonite-Callender's new GARRISON JOINT offers a simple and economical solution to this problem by distributing the stress along the cable instead of allowing it to concentrate at the joint.

Key to the long-life effectiveness of the GARRISON JOINT is the tapered Okometal sleeve illustrated. This lead sleeve wraps around the lead sheath of the cable, and is fused into the wipe. Result is a reinforcement which, by distributing stress, prolongs the bending fatigue life of cable to *three times* its normal value.

The Okonite-Callender GARRISON JOINT is practical and simple to install, differing from a normal joint only in the use and method of applying the tapered sleeve. Sleeve can be used with almost any joint assembly.

Ask your Okonite representative to show you how simple it is to make the GARRISON JOINT. Or write for a copy of Bulletin WE-1051, to The Okonite Company, Passaic, N. J.

OKONITE SINCE 1878

THE BEST CABLE IS YOUR BEST POLICY

insulated wires and cables

8973

CERTIFIED BALLASTS are *Quiet*

Audible "humming" from a fluorescent ballast is highly annoying . . . yet some people believe this noise is an unavoidable part of fluorescent lighting.

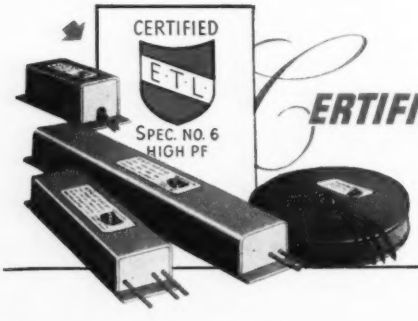
This is not true. Seldom do you hear a **CERTIFIED BALLAST** that is properly installed in a fixture. It operates efficiently and quietly.

Freedom from noise is but one advantage of **CERTIFIED BALLASTS.** You also get...

- Maximum light output (poor ballasts may reduce light by 20%)
- Full lamp life (poor ballasts may shorten lamp life by ⅓)
- Long, trouble-free, dependable service.

CERTIFIED BALLASTS are made to exacting specifications, then tested and checked by Electrical Testing Laboratories, Inc.

• Complete information on the types of CERTIFIED BALLASTS available from each participating manufacturer may be obtained from Electrical Testing Laboratories, Inc., East End Avenue at 79th Street, New York, New York.



Participation in the CERTIFIED BALLAST program is open to any manufacturer who complies with the requirements of CERTIFIED BALLAST MANUFACTURERS.

CERTIFIED BALLAST MANUFACTURERS

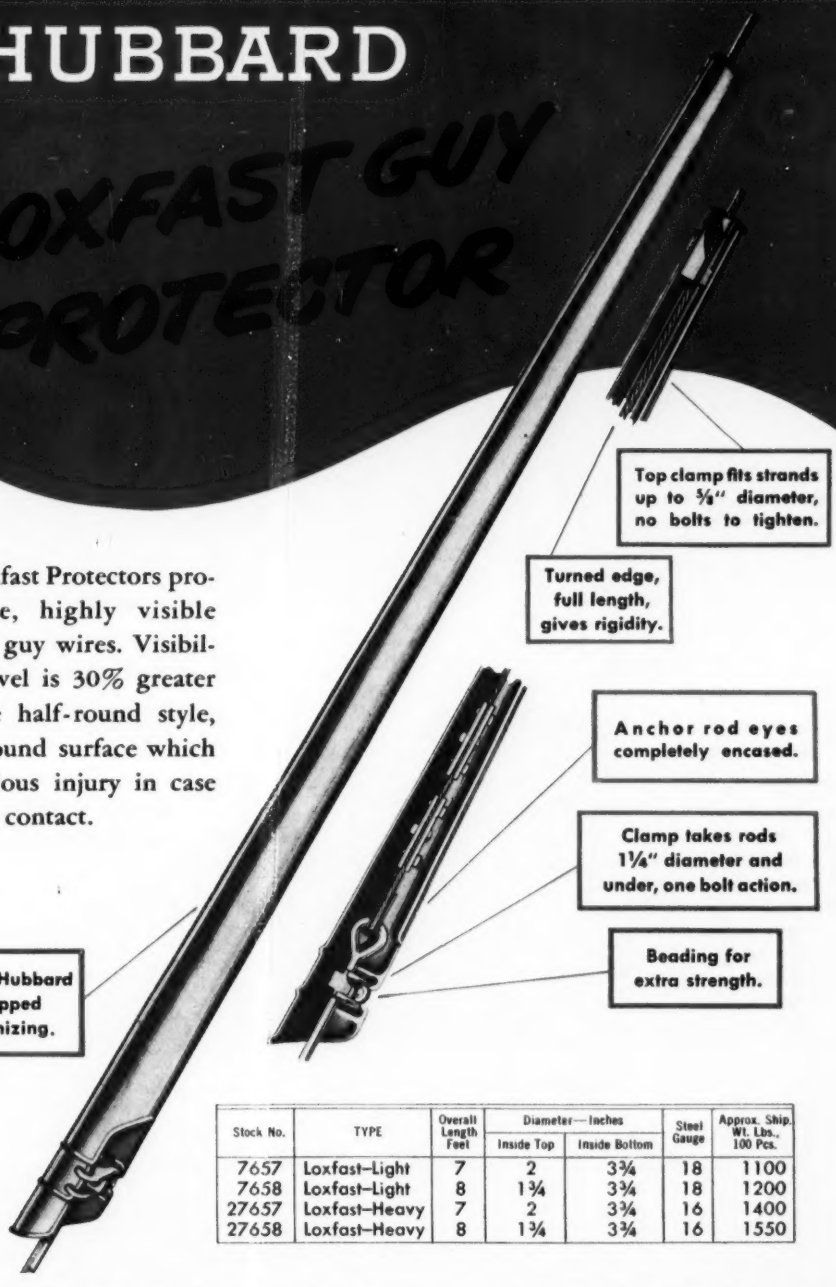
Makers of Certified Ballasts for Fluorescent Lighting

2116 KEITH BLDG., CLEVELAND 15, OHIO

HUBBARD

LOXFAST GUY PROTECTOR

Hubbard Loxfast Protectors provide a large, highly visible covering for guy wires. Visibility at eye level is 30% greater than for the half-round style, plus a full-round surface which prevents serious injury in case of accidental contact.


Top clamp fits strands up to ⅝" diameter, no bolts to tighten.
Turned edge, full length, gives rigidity.
Anchor rod eyes completely encased.
Clamp takes rods 1¼" diameter and under, one bolt action.
Beading for extra strength.
Permanent—Hubbard Double-Dipped Hot Galvanizing.

Stock No.	TYPE	Overall Length Feet	Diameter—Inches		Steel Gauge	Approx. Ship. Wt. Lbs., 100 Pcs.
			Inside Top	Inside Bottom		
7657	Loxfast–Light	7	2	3¾	18	1100
7658	Loxfast–Light	8	1¾	3¾	18	1200
27657	Loxfast–Heavy	7	2	3¾	16	1400
27658	Loxfast–Heavy	8	1¾	3¾	16	1550

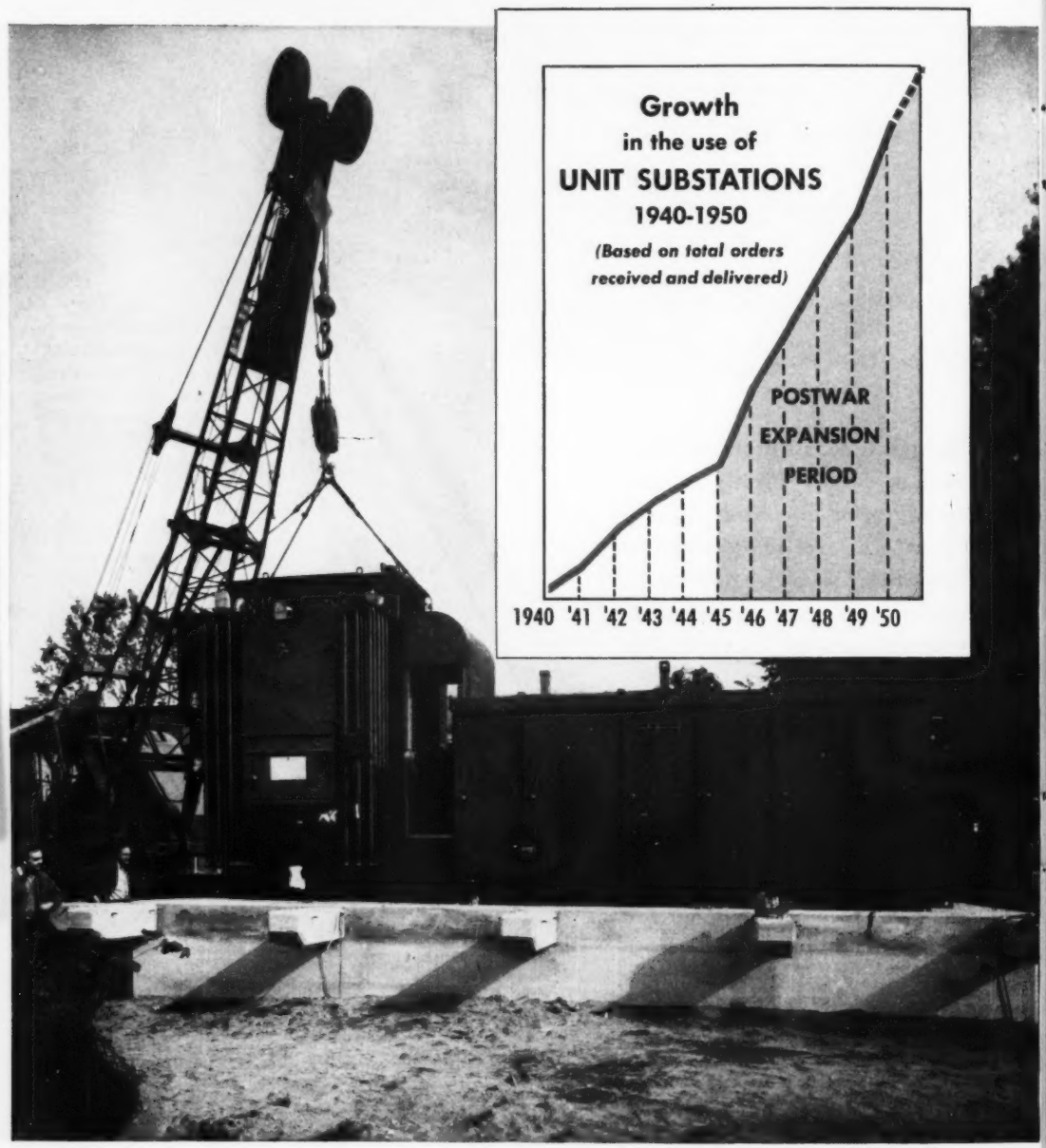
HUBBARD AND COMPANY

ESTABLISHED 1843

PITTSBURGH • CHICAGO • OAKLAND, CALIFORNIA

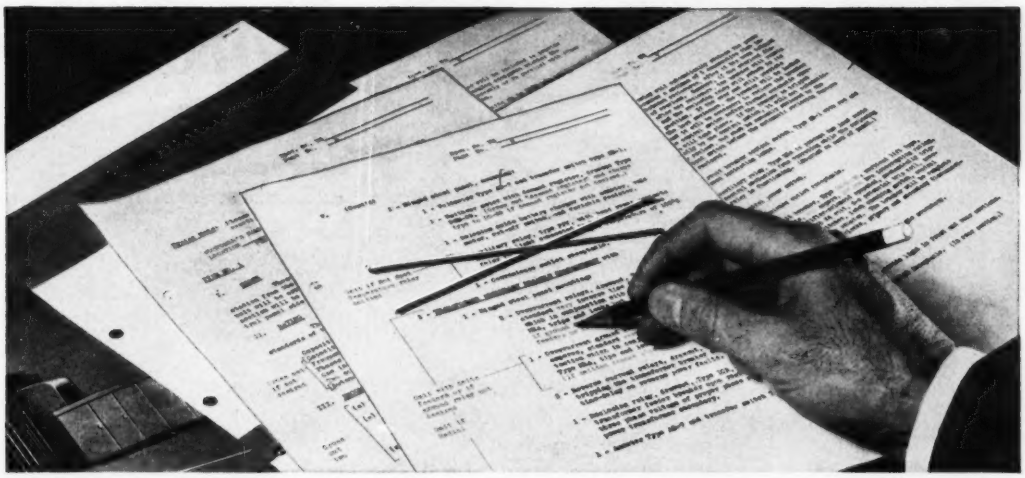
"Hang the Load on Hubbard Hardware!"

Unit Substations—Key to



QUICK INSTALLATION: G-E unit substations come to you complete—ready for operation. You merely build the foundations, position the equipment and connect to your incoming and outgoing lines. Photo shows G-E unit substation being installed on the system of the Western Massachusetts Electric Co.

Fast, Low-cost Expansion



WEEKS SAVED IN ORDERING! Basic guide-form specifications for G-E unit substations are available to you, and using these, you merely add ratings and number of circuits required and cross out details not applicable. Weeks are saved in detailing layouts and piecemeal ordering. Your engineers have more time for other system work.

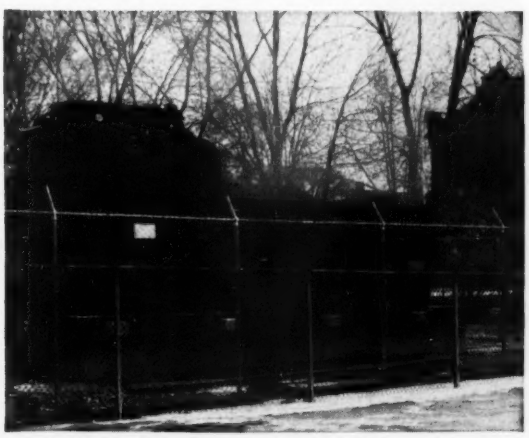
Simplified purchasing, ease of installation help in meeting fast-growing loads . . .

The rapid trend to factory-assembled unit substations—as shown in the chart at the left—seems sure to accelerate even more tomorrow.

Faced with the fastest-growing loads in history, utilities are finding these standardized, easy-to-install units one of their most valued tools in meeting expanding power demands quickly and at lowest cost.

Because of their great flexibility, compactness and adaptability, G-E unit substations are applicable to a wide variety of system arrangements. Standard, co-ordinated designs simplify planning and purchasing.

There's less worry about manpower and material problems. And proved, factory-engineered construction assures outstanding dependability. For full information, write for Bulletins GEA-3800 and GEA-4500. *General Electric Co., Schenectady 5, N. Y.*



INSTALLED RIGHT AT LOAD: Compact, modern, attractive design of G-E unit substation enables it to be installed close to the load, even in many residential areas. Vital copper for secondary circuits is saved. The substation above was installed by the Western Massachusetts Electric Co. Note church in background.

321-74

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

HOW LONG

EVER since 1935 when the first Simplex-ANHYDREX rubber-jacketed cables were put on the market, they have shown themselves to be remarkably free from trouble. Not once in all that time has an ANHYDREX Cable failed because of water absorption. That's why we can't give an adequate idea of the length of service you can expect from ANHYDREX Cable.

But accelerated aging tests constantly carried on by the Simplex Laboratories give us good reason to predict that their service life will be long and trouble-free.

Tests for mechanical water absorption prove that during seven days' immersion at 158°F. (70°C.) Anhydrex SA insulation absolutely will not absorb more than 20 mg. of water per square inch of exposed surface.

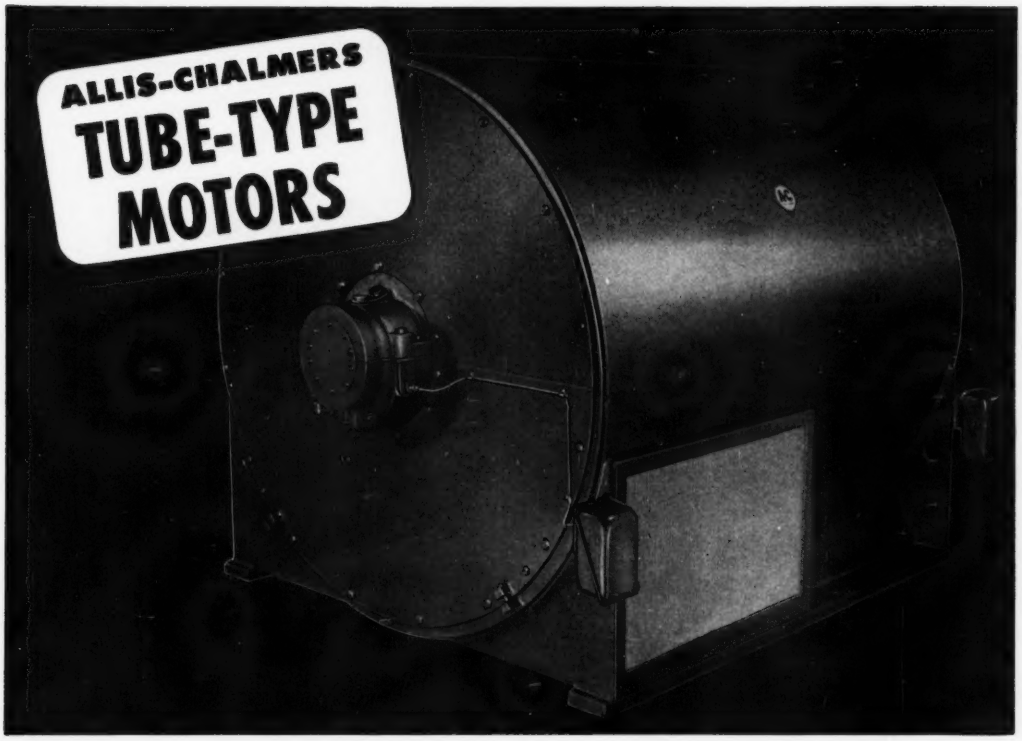
Tests for electrical stability in water show that after one day's immersion at 158°F. (70°C.) Anhydrex SA has a dielectric constant that will not exceed 3.2. The increase in capacitance between one and eight days' immersion at 158°F. (70°C.) will not exceed 3.5% for insulation thicknesses greater than 4 64″ or 5% for thicknesses of 4 64″ and less.

Physically too, ANHYDREX Cables are tops. Their tough neoprene jacket stands up under year-in, year-out exposure to soil acids and alkalies and is fully able to withstand all manner of rough handling. If you run your cables up above ground you'll find it provides protection against weather hazards, sunlight, and swaying tree branches.

Performances in the field back up the story our lab tests tell. Why not discover, yourself, just what these figures can mean? . . They're easily translated into added years of service per cable plus worthwhile savings for you.

SIMPLEX-ANHYDREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.



Self-Cleaning Motor

Keeps Maintenance Costs Down

MOTOR CLEANING ROUTINE AND COST ARE PRACTICALLY ELIMINATED by the Allis-Chalmers tube-type, totally-enclosed, fan-cooled motor. Even when installed outdoors in contaminated atmosphere, dirt and corrosion cannot harm it.

The reason for this outstanding performance is the unique tube-type cooling system. Cooling air circulates through a nest of tubes which surrounds the stator, removing heat from the interior of the motor. The generous flow of air through the straight tubes carries dirt out to the atmosphere. There are no corners or pockets, as in conventional designs, which might collect large dirt deposits. If the tubes ever should need cleaning, a brush on a long handle will do the job in a few minutes.

Sizes range from 75 hp up. Tubes and end plates may be made of special corrosion resistant materials where necessary.

To-day, when manpower is high-priced and getting scarce, cutting maintenance time and cost is more important than ever. Ask your Allis-Chalmers representative to show you how this exceptional motor can reduce your maintenance requirements. Or write to Allis-Chalmers, Milwaukee 1, Wisconsin.
Ask for Bulletin 05B7150. A-3322

ALLIS-CHALMERS

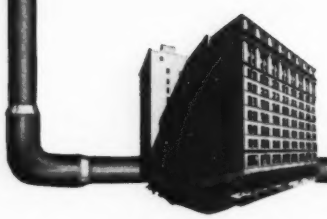
PULLING

Hi ROCKBESTOS A.V.C.

INTO THE OLD CONDUIT

INCREASED CAPACITY

FROM 320 TO 470 AMPS.



G. Fox & Company, Connecticut's largest department store, had a problem. Their building was modern — attractive. However, the electrical distribution system was sized for 1920 loads — couldn't handle the heavy demands of modern lighting, escalators, etc.

The Solution — Rockbestos A.V.C.! Because Rockbestos A.V.C. carries more current size for size than ordinary cable, it offered an ideal solution. They pulled out the old cable — pulled Rockbestos A.V.C. into the old conduits. Capacity was increased 50% *without* replacing conduit — *without* major building repairs — *without* disorganization of selling areas.

Rockbestos A.V.C. is the answer whenever overload circuits are a problem. Write for "Rx for a Building with Hardening of the Arteries."

Hi *Your best buy because*

- **You Use Existing Conduits** yet increase capacity 30 to 50%.
- **You Avoid Building Repairs** such as the bracing, replastering, repainting, normally required for major electrical alterations.
- **You Save Time** because A.V.C. can be pulled into place *fast*.
- **You Avoid Business Interruptions** since rewiring with A.V.C. in existing conduits is clean and easy.

ROCKBESTOS PRODUCTS CORP.
NEW HAVEN 4, CONNECTICUT
New York • Cleveland • Chicago • Detroit
Pittsburgh • St. Louis • New Orleans • Los Angeles
Oakland, Calif.

Safest...coolest!

THIS RADICALLY NEW Federal Noark Front-Operated Safety Switch is the coolest-operating switch available. It features guaranteed current break . . . visible blade construction . . . a special 3-position, front-operated handle . . . arc mufflers or Rolarc snuffers. Accommodation for four padlocks makes the switch practically tamper-proof.

Type "A" Federal Noark Front-Operated Safety Switches come in 30, 60, and 100 ampere capacities for 230-volt A.C.—250-volt D.C., and for 575-volt A.C.—600-volt D.C. The Type "C" Front-Operated Safety Switches are made in the same sizes and ratings with many of the same advantages.

Order these superlative switches from your Federal Noark distributor. And write us today for free booklet. Federal Electric Products Company, Newark 5, N. J.

COOLEST . . . The new Noark Safety Switch has only two joints to each pole, both under high tension.

COOLEST . . . Pressure spring of patented fuse holder located in block under fuse where unaffected by heat.

SAFEST . . . This is the only visible blade switch with the operating cross bar beneath the switch blades.

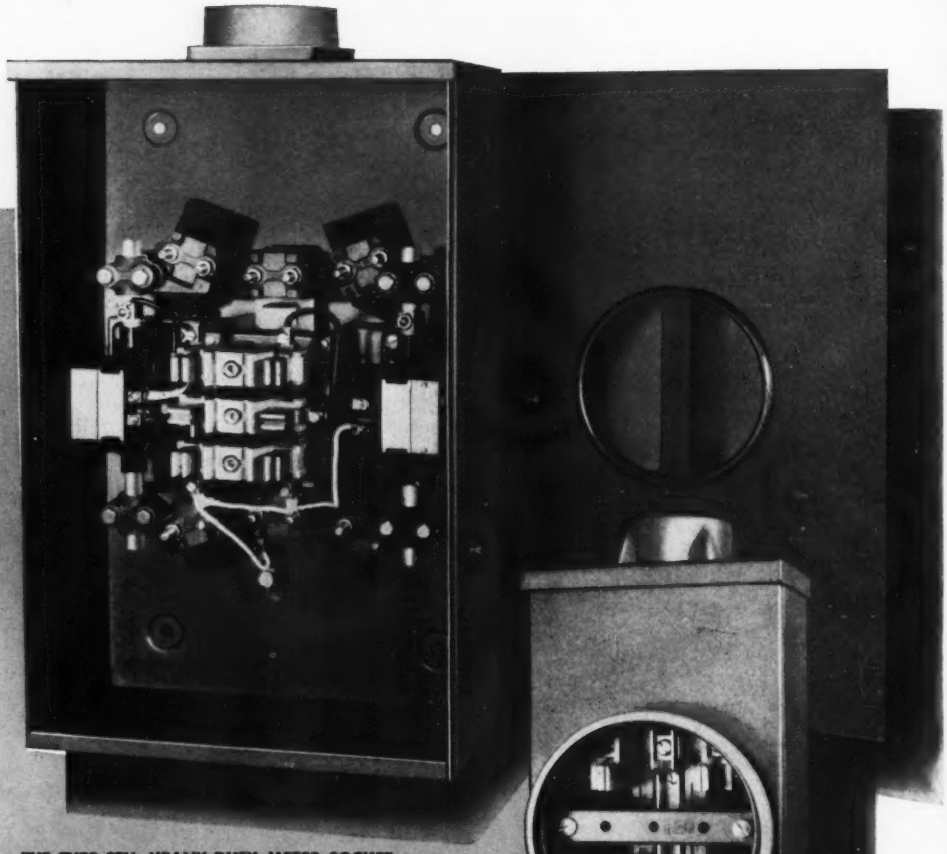
SAFEST . . . New Front-Operated Switches of more than 250 volts are protected by Noark Rolarc Snuffers.

TIME-SAVING . . . Ample wiring space and removable interior make wiring extremely easy.

FEDERAL NOARK

Federal NOARK

Complete line of Federal Electric Products includes Motor Controls, Safety Switches, Service Equipment, Circuit Breakers, Panelboards, Switchboards, Control Centers, Bus Duct ★ Sales offices in principal cities.



THE TYPE STU, HEAVY-DUTY METER SOCKET

- Takes standard S-type meters
- Takes up to No. 0000 cable
- Utilizes full inherent capacity of 50-amp meters
- Has removable jaws and terminal assembly
- Compact design—saves space
- Fully automatic circuit closing device

THE NEW TYPE STS TRANSOCKET

- Contains integral transformers
- Handles heavy loads—up to 400 amperes
- Cuts installation costs
- Compact design—saves space

THERE'S A WESTINGHOUSE METER FOR EVERY APPLICATION!

Single-phase watt-hour meter

Combination poly-phase watthour and thermal demand meter

Combination single-phase watthour and thermal demand meter

Polyphase meter with block interval demand register

Two New Ways
to cut metering costs on heavy loads

Here's a pair of Westinghouse "firsts" designed specifically to cut your metering costs—the STU High Capacity Socket and the new STS Transocket, with integral transformer.

Both sockets are ideal for heavy current applications where it was formerly necessary to devise special metering facilities. They install easily . . . inexpensively . . . and take standard meters. For electric house heating, outdoor pumping installations and many large commercial loads, their cost-cutting characteristics promise important new savings. And these new units are only part of . . .

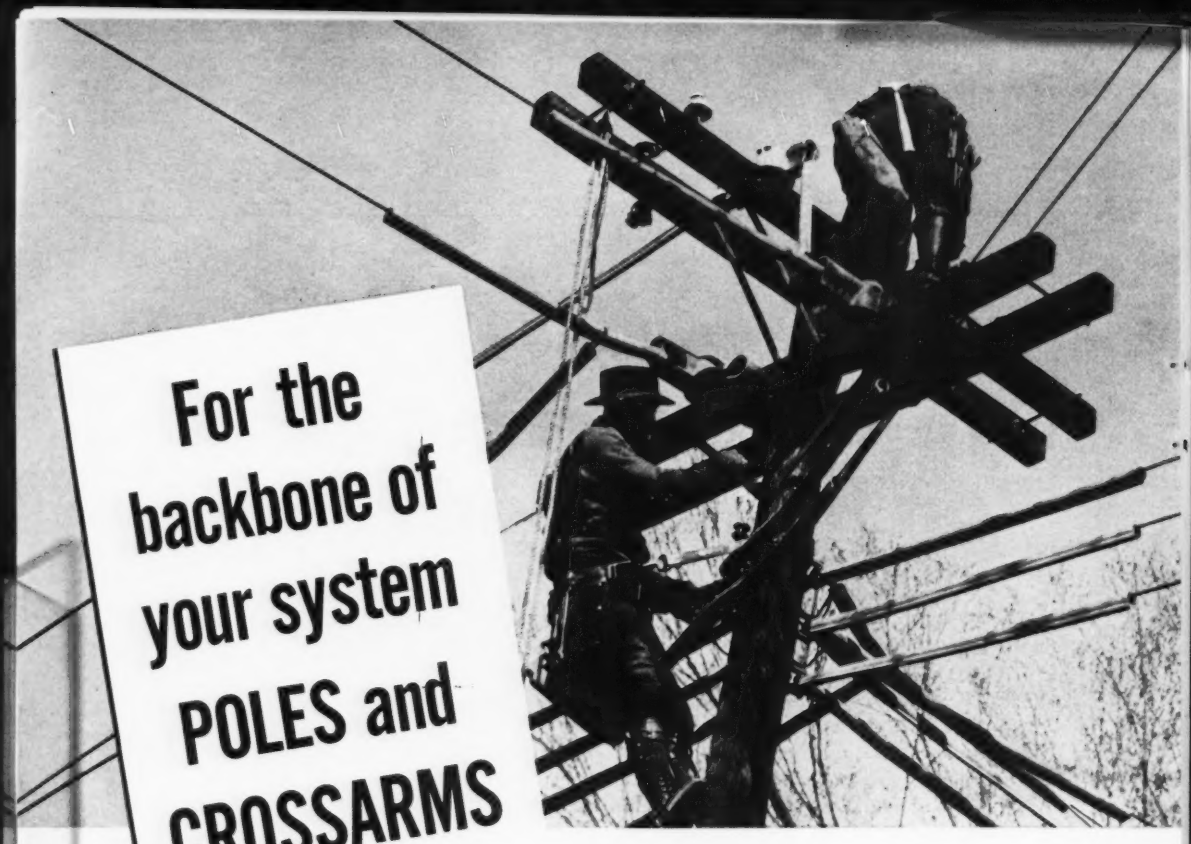
A complete line of metering equipment . . . one that meets all of your present needs . . . and anticipates many of your future requirements!

In the complete line of Westinghouse Metering Equipment you'll find many opportunities for savings. So whether your needs involve metering large loads or small, single or polyphase circuits, kw or kva, Westinghouse is a good place to go.

For complete information on High Capacity Sockets, write for Bulletin CS-42-810. Address: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-40396

YOU CAN BE SURE.. IF IT'S Westinghouse METERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.



For the backbone of your system POLES and CROSSARMS

Via GraybaR

The pole-line backbone that supports today's essential power lines needs seasoned strength and durability to do its job efficiently and at low maintenance cost.

That's one reason why power companies all over the nation choose Graybar for all their pole-line needs. They know that Graybar-distributed materials are always right for the job and stand up under abnormal stress of storms, ice, and snow.

POLES – Differing conditions lead to different local preferences. That's why Graybar distributes *all* types of poles – full-length, pressure-treated Southern Pine . . . full-length, pressure-treated Fir and Cedar . . . butt-treated Northern and Western Cedar.

All treated poles are carefully selected and processed to provide maximum strength and durability – plus the clean, smooth exterior surface required for city use.

CROSSARMS – Douglas fir crossarms via Graybar are selected and seasoned under rigid methods – are strong, long-lasting, and provide a wide margin of safety in the line.

POLE-LINE SUPPLIES – Graybar also distributes insulators, wire, cable, strand, hardware, tools, and hundreds of other needed pole-line supplies – all products of outstanding manufacturers.

To keep the backbone of your system strong, order your supplies from Graybar. You'll always get dependable items, and the nationwide Graybar warehouse system helps assure the *fastest possible* deliveries under today's uncertain conditions.

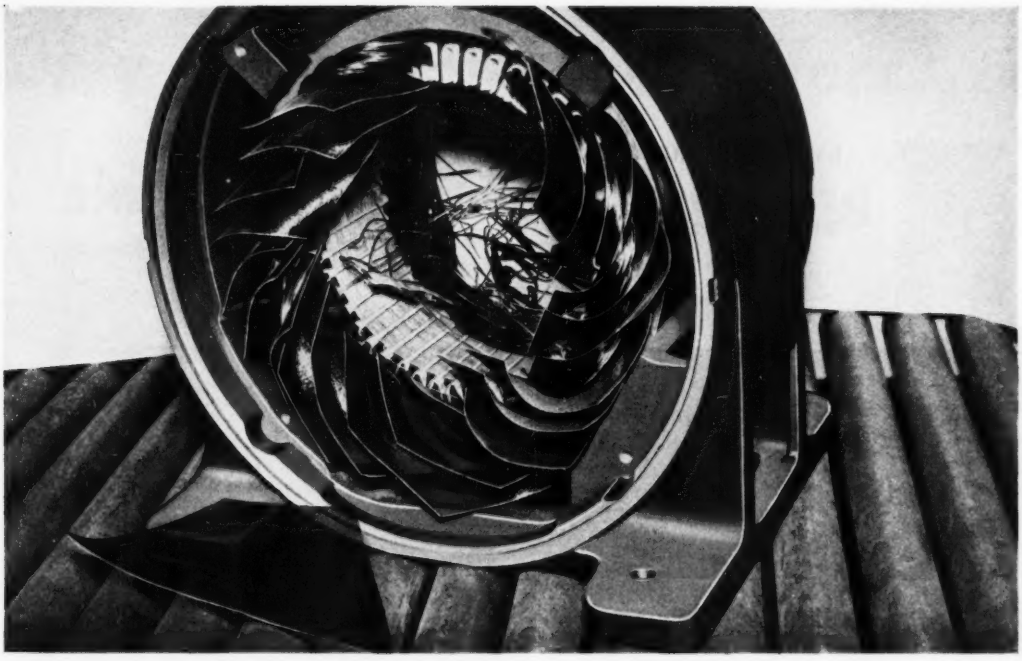
Because Graybar is wholly owned by its operating and retired personnel, you can always expect an extra measure of personal interest in serving you. Feel free to call your local Graybar Representative for information on any electrical item . . . call your nearby Graybar Outside Construction Specialist for planning aid and technical advice. *Graybar Electric Company, Inc. Executive Offices: Graybar Building, New York 17, N. Y.*

148-84

Everything for your pole lines

Via GraybaR

IN OVER 100 PRINCIPAL CITIES



When insulation must stand 500° Heat ...look to IRVINGTON'S Class "H" Line

Whether you are winding for service at high ambient temperatures — for increased *continuous* power ratings — for greater *short-time* overload capacity . . .

Or *designing* for space-and-weight savings . . .

You will find the Class "H" insulation you want in the complete Irvington line.

Depending on service requirements, *your* high-temperature insulation job may call for Silicone Varnished Fiberglas*, in yard goods, tape or tubing forms; Silicone Glass Mica; Silicone Saturated or Silicone Coated Asbestos; Silicone Rubber Coated Fiberglas; Silastic** Tape, Teflon Coated Fiberglas.

We make them *all* — we're ready to help you use *each* to best advantage. Write for a free copy of our book — Irvington Class "H" Insulations — it contains samples. Perhaps you'd prefer to talk with one of our engineers. The coupon below is for your convenience. Send it today. No obligation.

*Owens-Corning Fiberglas Corp. **Dow Corning

Send this convenient coupon now

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☐ Please send me a free copy of "Irvington Class 'H' Insulations".

☐ I'd like to see one of your engineers. Please have him phone or write for an appointment.

Name ..... Title .....

Company .....

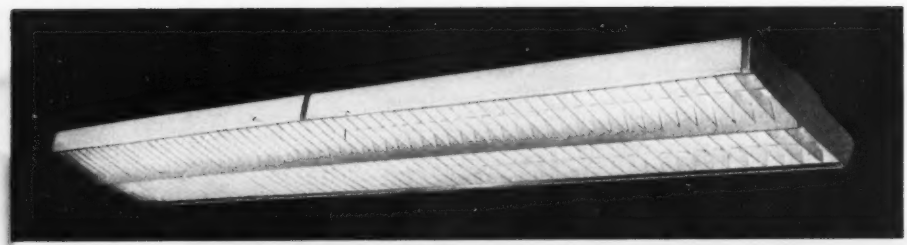
Address ..... Phone .....

City ..... State .....

Represented in the Western States by C. D. La Moree, Los Angeles, Berkeley, Seattle, Portland; Electric Motor Supply Co., Denver

EYE EFFICIENCY

WITH HIGH EFFICIENCY



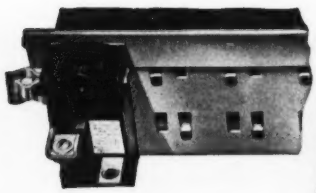
Only 4" deep, this new thin SUNBEAM 1280 luminaire has been designed with an eye toward providing a unit which combines the high efficiency of a bare lamp type with the low brightness, adequate shielding, and finished appearance of a shielded commercial. Ideal for areas where high intensity lighting on the seeing plane is required, the 1280 series eliminates the excessive source glare which usually accompanies such high intensity lighting systems, by means of easily removable plastic side panels and an all metal one piece louvre providing 30°x30° shielding. Available now for immediate delivery in all lamp lengths and milliamp ratings. Watch for this new SUNBEAM series—you'll be seeing it in stores and offices everywhere.

SUNBEAM LIGHTING COMPANY • 777 E. 14TH PL., LOS ANGELES 21, CALIF.

SUNBEAM visionaire LIGHTING COMPANY

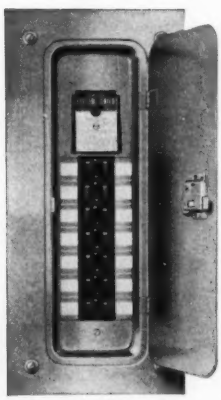
Only *Pushmatic*® offers...

1. simple push-button switching



2. individual units for flexible installations

Service Equipment Type
Up to 8 circuits



P1B Type
4 to 20 circuits
Single Phase, 3 Wire

P3B Type
12 to 42 circuits
3 Phase, 4 Wire

These handsome Pushmatic Electri-Centers are representative of BullDog's complete line for finest circuit protection and control. Write now for complete information.

SIMPLEST switching . . . most flexibility . . . surest protection . . . easiest installation . . . they're all yours in BullDog's Pushmatic Electri-Centers.

Just PUSH to make or break circuit. If circuit is broken by short or overload, PUSH and electrical service is immediately restored. No manual resetting . . . no fuses to fuss with.

Compact, individual-unit Pushmatics provide versatility and flexibility never before possible in any panelboard! Interchangeable regardless of rating or type, Pushmatics can be quickly inserted, removed or interchanged any time to meet changing electrical requirements.

Pushmatics revolutionize installation, too. Electri-Centers are compact yet provide larger wiring gutters, easier removal of interior assembly and complete accessibility of all electrical connections.

There's a Pushmatic to meet every load condition: THERMAL-MAGNETIC and THERMAL-MAGNETIC with exclusive AMBIENT COMPENSATING FEATURES. Ratings of 15, 20, 30, 40 and 50 amperes, 1 pole, 120 V., or 2 poles, 120-240 V., A.C.

For the last word in circuit protection and control, specify Pushmatic Electri-Centers!

BULLDOG ELECTRIC PRODUCTS COMPANY
DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

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CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES

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Safety Switchboard Company
1445 Stevenson Street Tel. Hemlock 1-2470
San Francisco 3, Calif.

Paul L. Mullenbach Co.
3008 E. Olympic Blvd. Tel. Angelus 9-8101
Los Angeles 23, Calif.

Get Full Electrical

WITH MECHANICALLY TRIP-FREE PNEUMATIC OPERATION

YOUR CIRCUIT BREAKER is a long term investment that pays dividends daily in protection for your electrical system. Naturally, you want full electrical protection — the best protection your money can buy. That's an important reason why your pneumatically operated circuit breakers should be mechanically trip-free. Unless they're mechanically trip-free they may fail to reopen properly when closed against a fault condition.

TRIP-FREE ADVANTAGES

Opening action of Allis-Chalmers pneumatically operated breakers is immediate and positive, because tripping instantly uncouples contacts from the closing mechanism. Opening occurs whether the breaker is in normal closed position or is "closing in" on a short circuit.

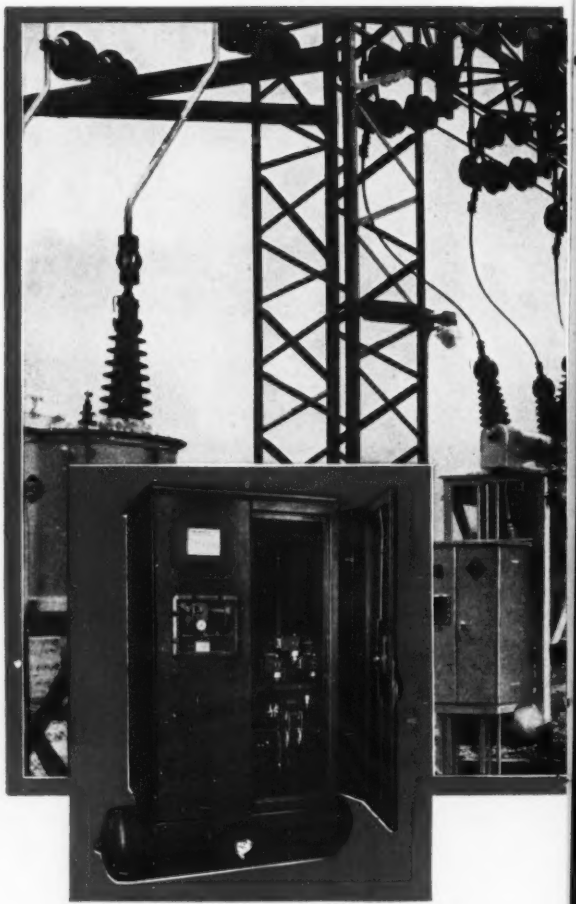
Breaker opening is independent of the closing piston and air valves. There is no drag from the closing mechanism.

Designed for high speed (20 cycle) reclosing, these breakers combine fast acting power of pneumatic operation with fast recoupling of contacts and reclosing mechanism. Stored energy for fast closing comes from a self contained air pressure tank with compressor.

You can gain the advantages of mechanically trip-free operation in every Allis-Chalmers power oil circuit breaker — whether pneumatically, solenoid or manually operated. It is standard in all sizes and ratings.

More than one-half century of experience stands behind the dependable operation of these breakers, serving industry since 1899. This dependability is being proved daily in utility and industrial installations coast to coast.

Call your Allis-Chalmers district office for more information on power oil circuit breakers. Or write Allis-Chalmers, Milwaukee 1, Wis., for your copy of the mechanically trip-free pneumatic operator bulletin. A-3355



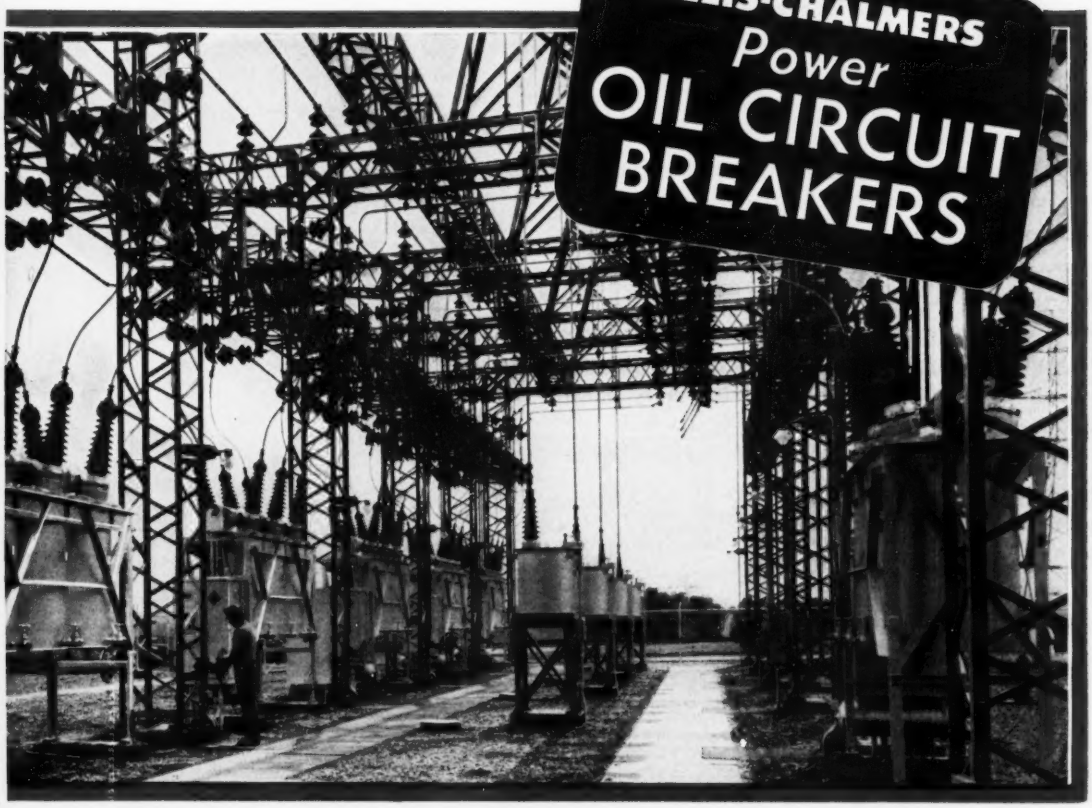
Weatherproof operator housing furnishes double protection against moisture.

For keeping out wind-driven weather, double doors with full length hinges are recessed. They have provisions for gasketing. The large safety glass window in the door permits a quick check of air pressure gauge, position indicator, operation counter and nameplate.

The operator is protected against condensation. The air tank is outside of housing. Thermostat controlled electric heaters keep both the operator and housing interior above ambient temperature. All parts are rustproof.

Protection

ALLIS-CHALMERS Power OIL CIRCUIT BREAKERS



These FZO-151 circuit breakers are equipped with the reliable mechanically trip-free pneumatic operator. The *Ruptor* interrupting device and many other important features also contribute to your assurance of positive operation. The FZO-151 is rated 69 kv up to 3,500,000 kva with 8 to 5 cycle opening, 20 cycle reclosing.

Ruptor and *Unitop* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

MECHANICALLY TRIP-FREE PNEUMATIC OPERATOR IS STANDARD EQUIPMENT ON ALL THESE ALLIS-CHALMERS OUTDOOR POWER OIL CIRCUIT BREAKERS

Type FZO-150 *Unitop* 14.4 to 46 kv, 8-cycle opening, 20-cycle reclosing*

Type FZO-151 . . . 69 kv, 5 or 8-cycle opening, 20-cycle reclosing*

Type BZO-160 . . . 69 kv, 8-cycle opening, 115 to 230 kv — 3 or 5-cycle opening with 20-cycle reclosing*

*20-cycle reclosing standard for 600 and 1200 amp breakers

Good Light

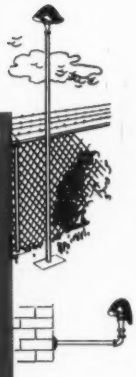
guards against intruders

The use of light to hold night-prowling marauders at bay dates back to man's earliest days. Appleton Floodlights give industrial plants and personnel this same time-tested protection in its most modern, most effective form. These big, rugged fixtures are expressly designed to guard industrial properties while providing the good light necessary for ideal working conditions.

For example, a series of Appleton Elipso Standlites—properly spaced along a fence-line or mounted on buildings—forms a veritable barrier of light. This is only one of the many expertly designed fixture models from the complete Appleton Floodlight line—a line that includes a sound, scientific answer to every known floodlighting problem.

For fixtures that meet every industrial requirement—including hazardous locations—whether indoors or out, contact Appleton, pacesetting manufacturer of Electrical equipment for nearly half a century.

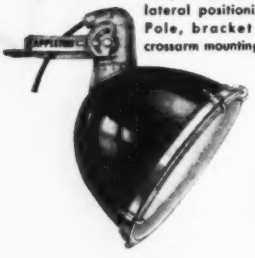
ELIPSO STANDLITE—Expertly designed to provide protection for industrial properties. Mounts on pole or wall.



APPLETON Floodlights

DIFFUSO FLOODLIGHT—For even illumination of service stations, athletic fields, parking lots, etc. Pole, bracket or crossarm mounting.

SPORTO—For high intensity illumination over large areas. Weatherproof hood allows for complete vertical or lateral positioning. Pole, bracket or crossarm mounting.



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APPLETON ELECTRIC COMPANY

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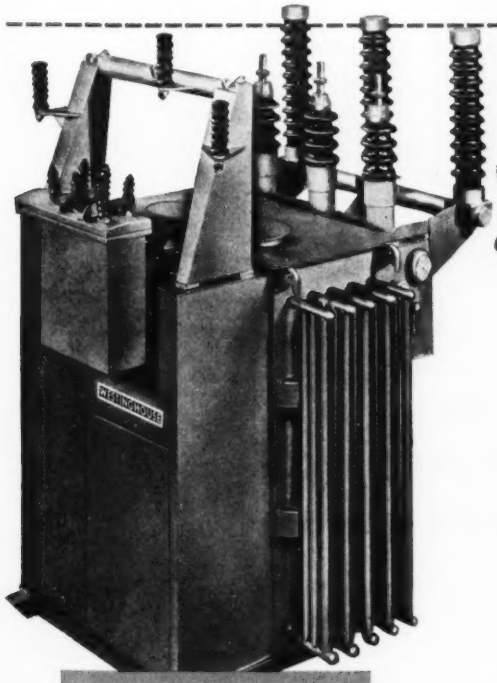
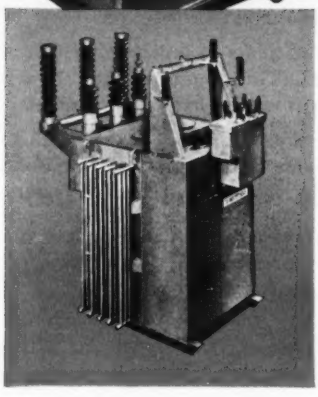
APPLETON

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

YOU CAN BE **SURE**.. IF IT'S
Westinghouse





The JUNIOR "CSP" POWER TRANSFORMER

NEW ECONOMY

... for small capacity substations

Here's the substation that fills a long apparent need in the power distribution field ... a smaller, yet complete, substation with integral high and low-voltage switchgear as well as metering equipment. And what's more, it's "CSP" (Completely Self-Protecting), with both thermal and lightning protection built in.

Designed for small towns and similar areas where the capacity of the feeder does not justify a larger rated "CSP" Power Transformer, the new "CSP" JUNIOR provides all the advantages of compactness, simplicity and ease of operation ... PLUS *low cost.*

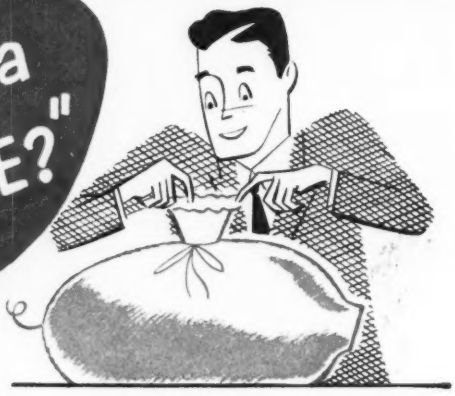
Available in 300 to 1000-kva ratings. For further information on all ratings of "CSP" Power Transformers, contact your Westinghouse representative, or write for Booklet B-4692. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania, J-70572-A

WESTINGHOUSE

Westinghouse
TRANSFORMER
EQUIPMENT

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

Why gamble on a "PIG IN A POKE?"



you know Exactly how every FLEUR·O·LIER luminaire will perform

There's no guessing about how a Fleur-O-Lier lighting installation will perform. You know in advance the tested, certified illuminating performance.

This certainty of results is possible because for every Fleur-O-Lier fixture there is available complete, authoritative performance data. Thus, you get the precise lighting results specified by the architect, contractor or lighting advisor.

Fleur-O-Lier gives you these advantages:

1. The Fleur-O-Lier Index System Rating, assigned by Electrical Testing Laboratories, Inc., after careful test, tells exactly what the illuminating characteristics of the luminaire are.

2. Complete photometric data is compiled by ETL.

3. Coefficients of utilization are computed by ETL. This data is essential in selecting the most suitable fixtures for the installation.

4. Certification by ETL assures the fixture was made to the rigid specifications covering electrical and mechanical features.

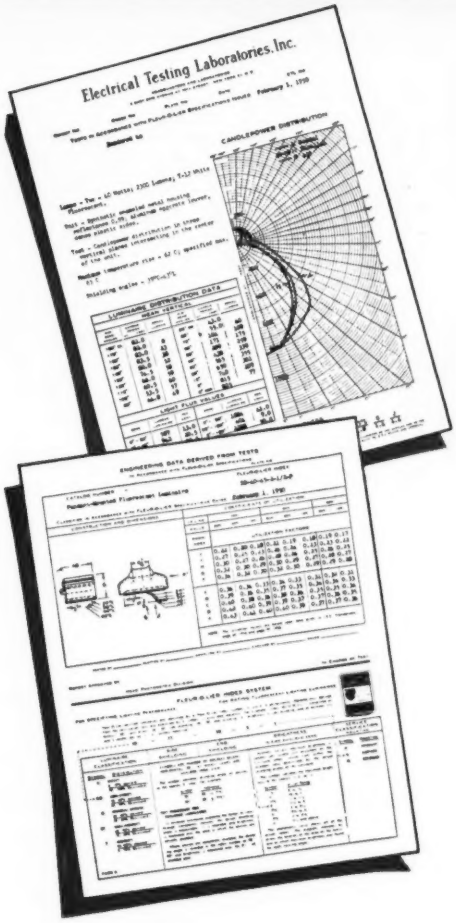
All this essential information lets you know in advance just what you're getting when you specify Fleur-O-Lier.

FLEUR·O·LIER

Manufacturers

2116 Keith Building • Cleveland 15, Ohio

Fleur-O-Lier is not the name of an individual manufacturer, but of a group of fixtures made by leading manufacturers. Participation in the Fleur-O-Lier program is open to any manufacturer who complies with Fleur-O-Lier requirements.



FLEUR-O-LIER DATA SHEETS give complete information

Manufacturers of Fleur-O-Lier fixtures provide Standard Data Sheets which give complete and detailed information on each Fleur-O-Lier fixture. Here, brought together on one sheet, is everything you need to know about the fixture—shielding—brightness—light distribution data—utilization factors—and construction and dimension details.

With more than 300 Fleur-O-Lier fixtures available from 25 different manufacturers—you have a wide selection of units to meet the needs of any installation.

How the Fleur-O-Lier System Enables You to Specify and Select the Right Units

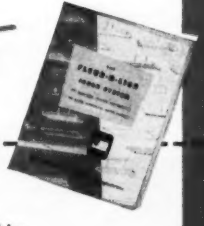
The Fleur-O-Lier Index System makes the specification and selection of lighting fixtures extremely simple. Merely ask the specification writer to express the desired illumination characteristics in the simple formulas of the Fleur-O-Lier Index System.

Then the selection of lighting equipment that fits exactly the requirements of the installation is easy. Choose from fixtures that have the requested Fleur-O-Lier Index System formula and you know you'll get the desired lighting results.

Don't take chances . . . specify Fleur-O-Lier and *know* what you're getting!

Certified
CERTIFIED
in accordance with Test Requirements of Specifications of Fleur-O-Lier Manufacturers
ELECTRICAL TESTING LABORATORIES, INC.
NEW YORK, N. Y.

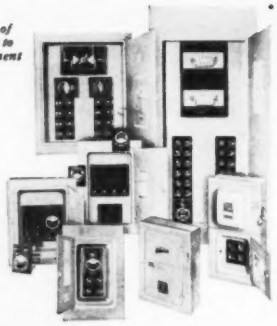
Free Booklet



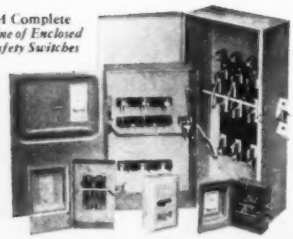
Write for your free copy of the new booklet giving complete details of the Fleur-O-Lier Index System.

Ask also for Electrical Testing Laboratories' report on performance ratings assigned to the 300 Fleur-O-Lier fixtures.

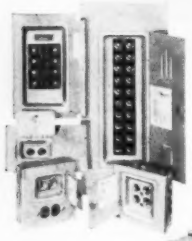
A Complete Line of Service Equipment to Meet Every Requirement



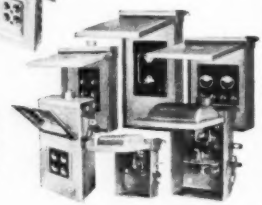
A Complete Line of Enclosed Safety Switches



There's Everything You Need in the General Line



A Complete Line of Branch Circuit and Residence Panels



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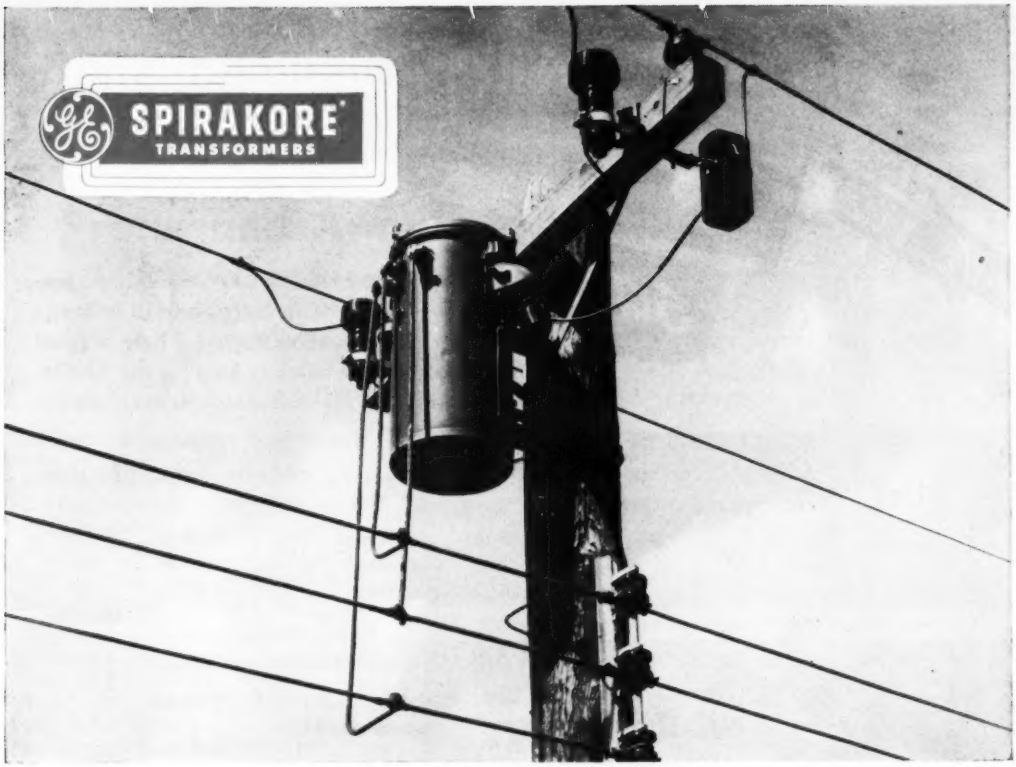
ELECTRICAL BOOKS

RESPONSE OF PHYSICAL SYSTEMS, by John D. Trimmer, 268 pages, 6x9, John Wiley & Sons, $5. This book on instrumentation and the measurement process shows how to use mathematical techniques on physical systems. The author follows the pattern of a broad introduction, a thorough treatment of simple systems, and intermediate treatment of more complex systems, and a brief introduction to the most difficult problems. A general study closely linked with cybernetics is built up around this pattern including in its domain not only physical systems, such as instruments, regulators, and servos, but also biological and sociological entities. Throughout the work philosophy and point of view are emphasized. Examples of physical systems are plentiful, diverse, and chosen with particular regard for subject and interest. The book is directed both to students and workers in engineering and applied physics who have an intermediate interest in learning the theory applicable to physical systems.

FRICTIONAL PHENOMENA, by Andrew Gemant, 495 pages, 6x9, Chemical Publishing Co., Inc., $12. Frictional processes in all fields of engineering such as gaseous viscosity, acoustic absorbents, viscosity of liquids, colloids and gels, plastic flow, internal solid friction and external friction are treated in a clear and logical manner in this comprehensive volume. It includes brief theoretical discussions and covers in detail experimental results, engineering applications, and a literature survey. The book proceeds step by step from simple to more complicated cases and, although mathematics is used where necessary, it is readable and its understanding does not require an advance mathematical background. Since the author's research activities embraced the fields of sound absorbing materials, liquid viscometry, structural viscosity of oils, ionic conduction in solids and damping of vibrations, the interpretation of these subjects is unique and original.

POWER SYSTEM STABILITY, volume II, by Edward W. Kimbark, 288 pages, 6x9, John Wiley & Sons, $8. Volume two covers power circuit breakers and protective relays and includes material on rapid reclosure of circuit breakers, and the performance of protective relays during swings and out-of-step conditions. Material on these subjects is a vital part of work on stability because the most important means of improving the transient stability of power systems are by faster clearing of faults by means of faster circuit breakers and relays and rapid reclosure of circuit breakers. Power Circuit Breakers and Protective Relays is the second volume of a proposed three-volume work entitled Power System Stability. Volume one, Elements of Stability Calculations, has already been published. Volume three will endeavor to give the reader a deeper understanding of power system stability than that afforded by volume one alone. It will deal with synchronous machines, excitation systems, damping and saturation. Because system stability is one of the livest problems of power engineers, this series is a welcome addition to literature on the subject.



Finish on General Electric Transformers saves one, maybe two, repaintings

San Diego Gas and Electric has been running extensive tests on paint finishes. The Melaglyp paint on General Electric transformers, they say, is superior to any other paint tested. It will save one, maybe two, repaintings.

This is testimony from a company that has in one location almost every condition that is unfavorable to paint: Salt spray. Dry spells during which salt never washes off. Heavy dew. Intense California sunshine.

Melaglyp, a greatly improved paint made with melamine-modified Glyptal* alkyd-resin, has been standard on all G-E Spirakore transformers shipped since 1947. We are confident that you'll find this paint is cutting your maintenance cost.

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402-104

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

saving aluminum here

saving of critical materials is not solely the prerogative of the huge giants of Industry. Here is a prime example of how a small Industrial Manufacturer is helping the Central Station Industry make substantial savings of aluminum.

Many Utilities are installing transmission lines using 795,000-CM, 26x7 ACSR. When this conductor is installed, using ordinary accessories, there are required at each support:

1—Aluminum suspension clamp . . .	10.63 lbs.
1—Set of tapered armor rods	13.7 lbs.
2—Ovoid clamps @ 0.68 lbs.	1.36 lbs.
	25.69 lbs.

But the equivalent Preformed Armor Rod installation requires only:

1—Smaller suspension clamp	7.91 lbs.
1—Set of 0.310" Preformed Aluminum Rods 100" long	10.10 lbs.
No Ovoid clamps	.....
	18.01 lbs.

saving— 7.68 lbs.

This results in a saving of 30% of critical aluminum. Similar savings develop for all sizes of conductor. And to further reduce the total consumption of aluminum, some Utilities use Steel Preformed Armor Rods on #4 and #2 ACSR.

saving of even more aluminum is made possible by using Preformed Armor Rods to:

1. Repair and rebuild transmission lines.
2. Rehabilitate old conductors.
3. Increase the current-carrying capacity of existing lines.
4. Lengthen the life expectancy of present and future lines.

armor rods today assure more operating conductor tomorrow

means more miles of conductor . . .

Preformed Armor Rods will . . .

- **INCREASE** the current capacity of splices, conductors in clamps, dead-ends and so on, by more than 30%.
- **LENGTHEN** the life of conductors where vibration, arcing and burning take their toll.

Easily installed in three minutes . . . even by inexperienced linemen . . . Preformed Armor Rods protect conductors better and at lower cost than ordinary armor.

They are better because only PLP rods grip uniformly over the entire conductor length.

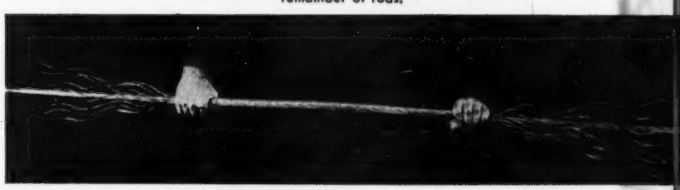
They are less expensive because your linemen make perfect installations every time, far quicker than with ordinary armor. Less expensive because only PLP rods eliminate concentrated stresses common in other forms of conductor protection.

Complete technical details and installation records are available. Just write to: *PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Avenue. Cleveland 3, Ohio.*

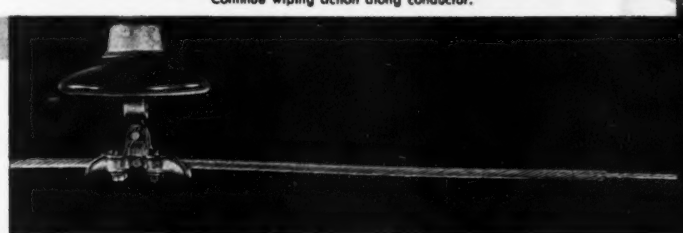
PLP ARMOR RODS ARE AVAILABLE IN ALUMINUM, COPPER, BRONZE, COPPERWELD, STAINLESS STEEL AND GALVANIZED STEEL—A TYPE FOR EVERY CONDUCTOR.

Take half to all of the rods needed and lay them across and around the conductor.

Wrap around conductor several times . . . like wringing water from a cloth. Apply remainder of rods.



Continue wiping action along conductor.



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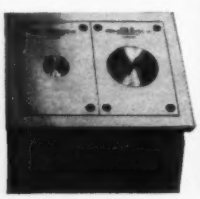
Again, increased demands for steel and other materials vital to the preservation of our freedom, together with—probably well-meant but confusing—Government controls, are working a hardship on honest and conscientious distributors and users of products such as ours.

Hoarding, black markets and illegal prices are again in the picture, but we assure our customers—buyers we have depended upon under normal conditions—that Steel City Electric Company will have no part in that picture. Regardless of how acute shortages may be, the NEEDS of our customers will be our FIRST and ONLY consideration.



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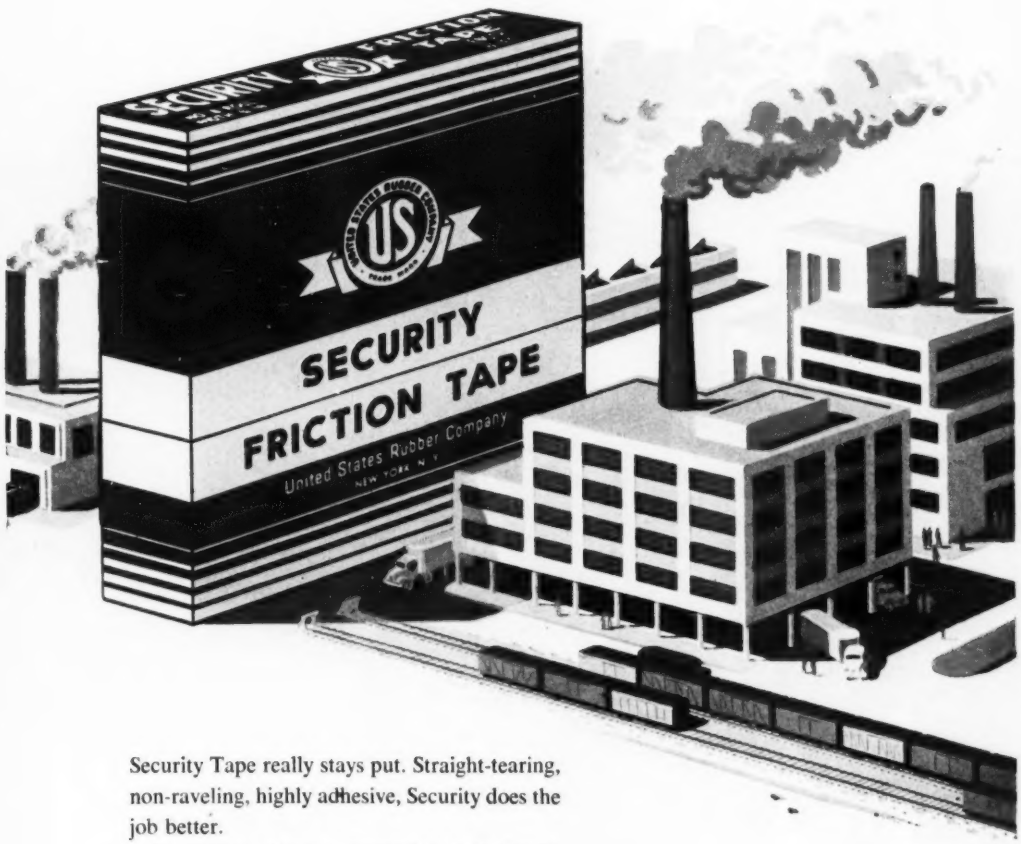

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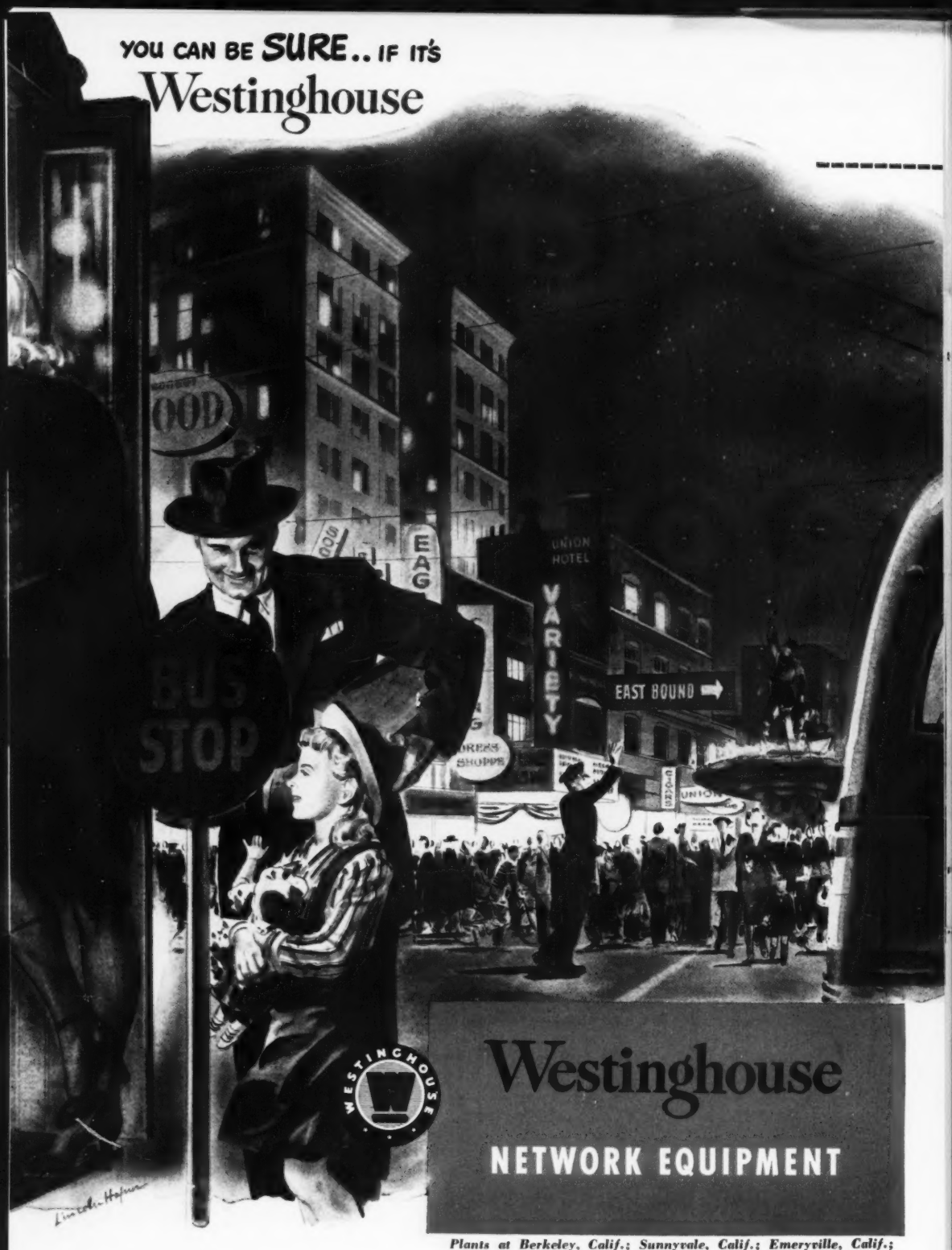

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

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Sixty-four per cent of the cities in the 100,000 to 250,000 population range enjoy the dependability and flexibility of secondary network systems! In larger cities the figure is 95 per cent! This is overwhelming proof of acceptance... and it is evidence of widespread action on this basic premise:

Growing loads can be handled most economically by switching to a secondary network system now!

Yes, the sooner you make the switch, the better, for never again will you have an opportunity to make the changeover as cheaply as you can *today!* You'll have less investment in stopgap equipment... a less expensive revamping job...a head start in secondary network savings.

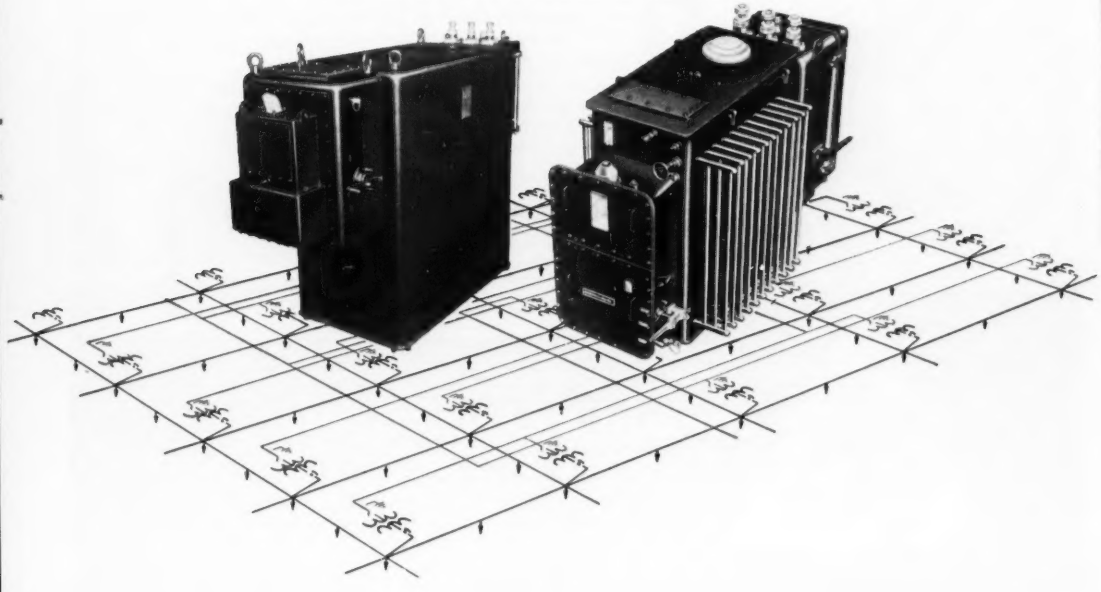
For medium-sized cities, secondary networks provide so high a degree of flexibility that load forecasting is no longer a major concern. Extensions, load shifts and load growth can be accommodated economically... layouts simplified... less and better co-ordinated equipment used. Operating costs go down... revenues and profits up!

As you plan your secondary network, look to Westinghouse for the equipment you'll need. Our complete, correlated line of network equipment includes the right transformers and protectors for all types of load areas.

Booklet B-4002, "A-C Secondary Network Systems", contains complete information. And remember... our complete facilities, engineers and calculating boards are available to help you with your network planning. Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

J-97144

Westinghouse Standardized Network Transformers... from liquid-filled units to submersible dry-type units ...match any degree of underground or overhead service.



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"It MUST Be Right!"

Triangle's two plants—one making wire and cable in New Brunswick, New Jersey, the other making conduit in Moundsville, West Virginia, have kept pace through the years with every advancement and are completely modern in machinery and equipment.

When it comes to wire, cable or conduit, you want assurance that it's *right* — right in quality, right in performance. Triangle products *are* right! Triangle's *long experience* coupled with modern machinery, modern methods and modern thinking means "It *Must* Be Right!"

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Experience plus modern facilities, modern methods, modern thinking — that's why Triangle can say with confidence — "IT *MUST* BE RIGHT!" That's why you can specify Triangle and know that "IT *IS* RIGHT!"

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He is your Triangle Distributor. In the same way Triangle offers quality *products*, your Triangle Distributor offers unexcelled *service*. See your Triangle Distributor *first*. In the long run you'll save and get it faster, from a Triangle Distributor.

THE TRADE-MARK OF TOP QUALITY!

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"Glazon" Building Wire • Glazon Non-Metallic Sheathed Cable • Armored Cable • Service Entrance, Service Drop, Varnished Cambric, Braided or Leaded, Trioprene Trench, Power and Parkway Cables • Bare Wire • Rigid Conduit Hot-Dipped Galvanized • Electric Metallic Thin Wall Conduit • Flexible Steel Conduit

Drop Forged

CONDUCTOR SUSPENSION CLAMPS. Drop Forged Conductor Suspension Clamps are an important part of BTC's *complete line* of transmission hardware. They are designed for use on all sizes and types of conductors . . . all classes of construction . . . all voltages . . . all line current loads . . . and all conditions of atmospheric corrosion.

These clamps are noted for their superior strength and resistance to shock and fatigue, their lasting reliability in service, as well as all of the properties inherent in drop forged metal parts. A wide range of sizes allows the choice of exactly the right clamp for your particular conductor.

Drop Forged Steel Clamps. Hot-dip galvanized series, suitable for all conductors. 6200A Series — Envelope Type. 7200 Series — Trunion Type.

Drop Forged Stainless Steel Clamps. BTC's 6200A and 7200 Series can be furnished in Non-Magnetic Stainless Steel, combining corrosion-resistance with minimum power loss and cool operation.

NEW M.P.L. SUSPENSION CLAMPS. BTC's new series of Minimum Power Loss Conductor Clamps minimize hysteresis and eddy current effects . . . conserve marketable power . . . eliminate heating, annealing and weakening of clamped section of the conductor . . . improve corrosion resistance.

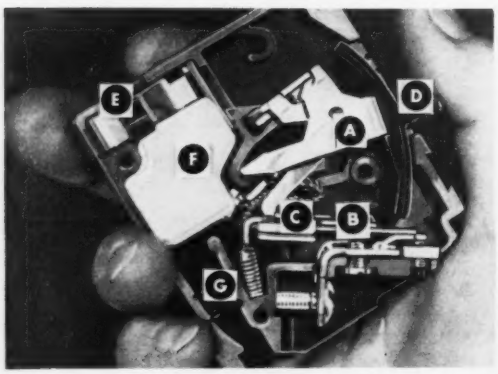
Drop Forged Heat-Treated Aluminum Alloy Clamps. Designed for A.C.S.R. and Aluminum Conductors. 9500 Series M.P.L. Clamps — Envelope Type.

Drop Forged Aluminum-Silicon-Bronze Clamps. High strength, zinc-free alloy with excellent resistance to corrosion. Designed for Copper, Copperweld and Copper Type Composite Conductors. 9700 Series M.P.L. Clamps — Envelope Type.

Sold through your insulator manufacturer only.

Write today for your copy of BTC's new Hi-Line Hardware Catalog which tells the complete story.

PRODUCT NEWS



Plug-In Circuit Breaker With Quick-Make, Quick-Break

(1) Trumbull Electric Mfg. Co., Plainville, Conn.

A new plug-in type circuit breaker for 15- to 20-amp services features quick-make, quick-break operation and thermal-magnetic protection. This TQL breaker incorporates a strong main operating spring that takes the action out of the hands of the operator, once the handle has been moved. It is claimed that contacts are opened and closed with a fast, clean action that avoids excessive burning or arcing of contacts from improper operation.

The breaker is tripped by either of two impulses. Thermal action of the bimetal trip element responds to an overload condition, although harmless temporary overloads will be passed without opening the circuit and magnetic action instantly opens the breaker in case of a short circuit.

Position of the handle is used to indicate a tripped condition. The breaker mechanism trips independently of the handle and cannot be held in the on position in case of an overload or short. The breaker also incorporates an arc chute of special refractory material that surrounds the contacts to smother the arc and an extended exhaust chamber for cooling the gases before venting.

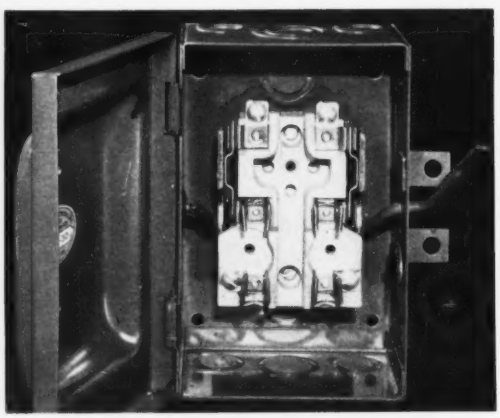
Bulletin TEB-12 describes the new breaker, which is Underwriters' approved.

Food Industry Motors

(2) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

Life-Line splashproof motors designed for food industry applications where splashing or hosing down exceeds NEMA standards for splashproofing are available in frames 326 and smaller. They have gasketed castiron conduit boxes with provision for attaching waterproof conduit. Motor windings are given multiple dips and bakes in moisture-resistant thermoset varnish. Baffles inside the rear splashproof hood prevent water creeping up inside the hood. Neoprene seals on the shaft outside the housing give protection against the entrance of water into the bearing housing, even under severe hosing operations.

For Additional Information Fill in the Coupon on Page 60



New Design for Entrance Switches

(3) Square D Co., 4335 Valley Blvd., Los Angeles 32, Calif.

Straight-wire terminal connections are now provided in type D, 30-amp entrance switches. Originally tested in the field in circuit breakers, the new design saves installation time, according to the manufacturer. A wire channel indentation receives No. 14 to No. 8 straight wire. To make the connection, the electrician loosens the terminal screw, removes insulation, lays the straight wire in the channel, tightens the screw. The indentation is so located that any pull on the wire will tighten the connections. This redesigned straight-wire terminal connection device is available in the manufacturer's D97211, D97311, D97351, D98251 and D99211 models.

Plastic Tree Trimming Poles

(4) J. B. Sebrell Corp., 300 S. Los Angeles St., Los Angeles 13.

A plastic insulator pole for tree trimming is claimed to be safer than wood around power lines and to be one-third the weight of a wooden pole. It is a plastic section of pole 4 ft long and 1½ in. in diameter. The insulator poles may be joined to aluminum or wooden poles or they may be joined together by using an aluminum sleeve connecting unit.

NEW M.P.L. STRAIN CLAMPS

The new Minimum Power Loss Series of Strain Clamps, now being offered by BTC, reduce hysteresis and eddy current effects to a minimum . . . save power . . . insure against heating, annealing and weakening of conductor within the clamp . . . and improve corrosion resistance.

- *5200 Series M.P.L. Clamps* Drop forged, heat-treated Aluminum Alloy Clamps, designed for A.C.S.R. and Aluminum Conductors.
- *5300 Series M.P.L. Clamps* Drop forged Aluminum-Silicon-Bronze Clamps, made from high strength, corrosion-resisting, zinc-free alloy. For Copper, Copperweld and Copper-Type Composite Conductors.

Sold through your insulator manufacturer only.

An entirely satisfactory method of dead-ending conductors on strain and angle construction is offered in *the complete line* of Transmission Hardware. For all conductors in general use . . . for all classes of construction . . . for all voltages . . . for all line current loads . . . for all conditions of atmospheric corrosion.

General design combines the superior mechanical properties and light weight of forged metal parts with a considerable reduction of the factors causing conductor-vibration damage. Slip strengths are more than adequate.

Installation is easy and economical, without special equipment . . . conductor may be strung between clamps or from clamp to apparatus without cutting and without splices, insuring permanently trouble-free operation.

Range of sizes is sufficiently wide to allow selection of just the right clamp for your conductor.

- *5000 Series Drop Forged Steel Clamps* Hot-dip galvanized and suitable for all conductors.
- *Drop Forged Stainless Steel Clamps* 5000 Series can be furnished in Non-Magnetic Stainless Steel, combining corrosion-resistance with minimum power loss and cool operation.

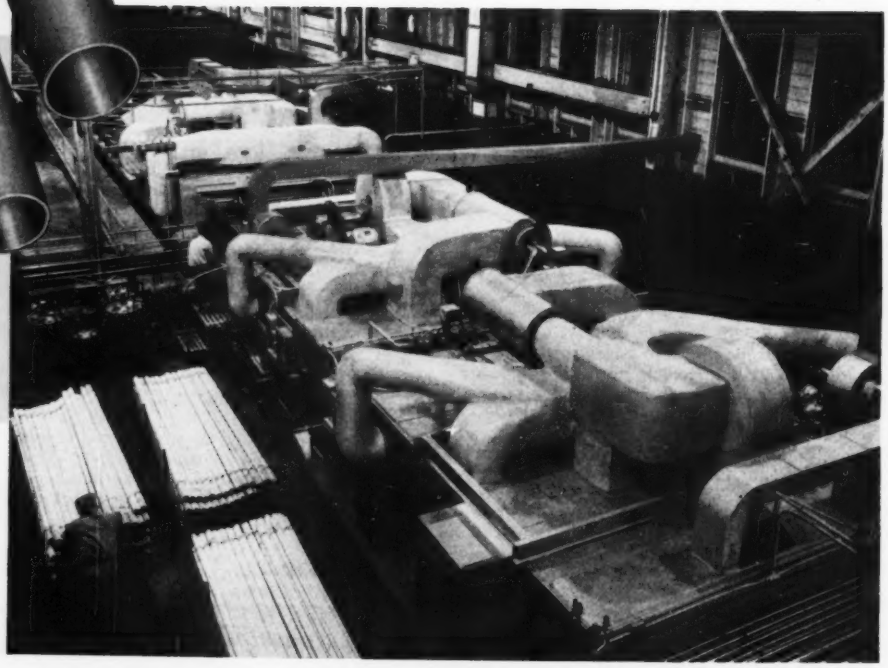
Write today for your copy of BTC's new Hi-Line Hardware Catalog which tells the complete story.

THE BREWER-TITCHENER CORPORATION, Cortland, N.Y.

In The West It's

ROME • EMT 90° Elbows

Available
in conveniently
packaged sizes of
¾", 1", 1¼", 1½" and 2".



Rome • EMT

THE *BETTER* ELECTRICAL METALLIC TUBING

Light in weight, easy to bend, economical to use . . . It is the preferred EMT in the West

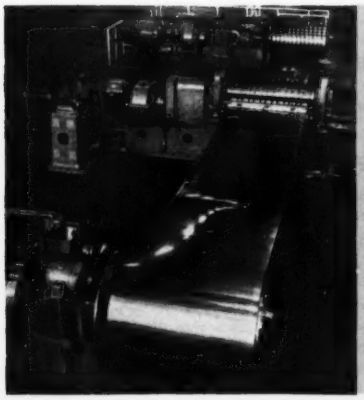
Made in the West to serve the West, ROME • EMT has a reputation for uniformly *high quality and easy workability*. In its Torrance, California plant, Rome Cable has spared no expense in making ROME • EMT a *superior* product. Manufactured on automatic equipment of latest design (see photographs below), ROME • EMT is uniform in weight, gauge and finish. Countless users now acclaim it as the *preferred* electrical metallic tubing.

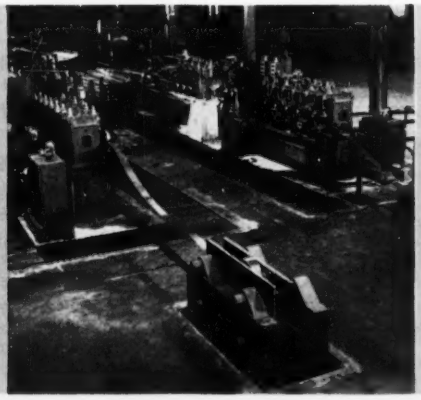
For exposed or concealed wiring, ROME • EMT hits a new high for safe and long-lived rigid steel raceway installation. Its interior is mirror-smooth . . . "clean as a shotgun barrel" users say . . . while the exterior is uniformly coated with corrosion and abrasion resistant zinc by electro-galvanizing.

Try ROME • EMT and be convinced. It takes the hard work out of conduit installation . . . it saves time . . . *it saves money.*

Approved by Underwriters' Laboratories, Inc. and available in ½", ¾", 1", 1¼", 1½" and 2".

It Costs Less to Buy the Best





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Left: Discharge end of electro-galvanizing and enameling unit

Above: Equipment for slitting steel to accurate width from jumbo roll

Above Right: Of advanced design, these units form and automatically weld the tubing

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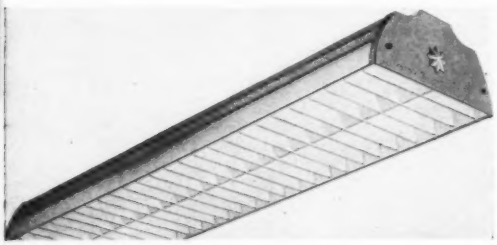
Truck-Mounted Platform

(5) Hugh B. Williams Mfg. Co. Distributed by Joslyn Southwest Co., 5100 District Blvd., Los Angeles; 180 Potrero St., San Francisco

Designed for use in power line or other construction where it is necessary to get quantities of men and material on top of structures, this truck-mounted platform is claimed to set up vertically regardless of truck position. It can be built for any desired height up to about 70 ft or to raise any specified load, the manufacturer states. It also may be built with the platform so designed that it collapses when in traveling position but, when in use, can span a standard H-frame structure to provide a cat walk along the top.

The unit is built of aircraft steel tubing; will conform to state highway underpass clearance regulations. The platform is raised and lowered by cables, and the manufacturer claims that it is impossible for it to fall or for the driving mechanism to damage the structure if it is hung up on any obstacle. It may be built for control from the ground or by the men on the platform; may be operated from a suitable power take-off if desired.



F Fixture Features Shielding

(6) Curtis Lighting Inc., Dept. O-16, 6135 W. 65th St., Chicago 38, Ill.

New addition to the Forty-Sixty line, the 4063 offers 35° crosswise and 45° lengthwise shielding for locations where the fixtures are installed parallel to the line of vision. It uses two 40-watt, T-12, 48-in. fluorescent lamps. According to the manufacturer, low brightness blends with the illuminated ceiling to secure high levels of quality illumination, without annoying glare. Side reflectors are Alzak aluminum and the center v-bar reflector, louver fins and wiring channel are steel, finished in white Fluracite enamel.

Room Air Conditioner

(7) Mitchell Mfg. Co., 2525 N. Clybourn, Chicago Ill.

Features of the new model M-131, 1/3-hp room air conditioner, a packaged window unit, are a mount that allows the unit to be used in a conventional double-hung sash window as narrow as 22 in. The window may be raised or lowered all the way between the outside and decorative cabinets, thus simplifying window washing. Construction of the mount makes for easy installation.

Pole Aligner Designed to Save Time

(8) Hugh B. Williams Mfg. Co. Distributed by Joslyn Southwest Co., 5100 District Blvd., Los Angeles; 180 Potrero St., San Francisco

This pole aligning device is intended for use after an H-frame structure has been placed in the holes. Mounted on a tractor when in use, the device is backed into position and affixed to the H-frame structure by hydraulic boomer chains. It is then possible for one man to move either pole individually or both poles simultaneously in any direction or manner desired until the structure is perpendicular. The unit will hold the structure in position until the dirt has been tamped in place. It is claimed that the device reduces time per structure from approximately 1½ hours to one-half hour.

Auger Line Extended

(9) Petersen Engineering Co., 460 Kifer Road, Santa Clara, Calif.

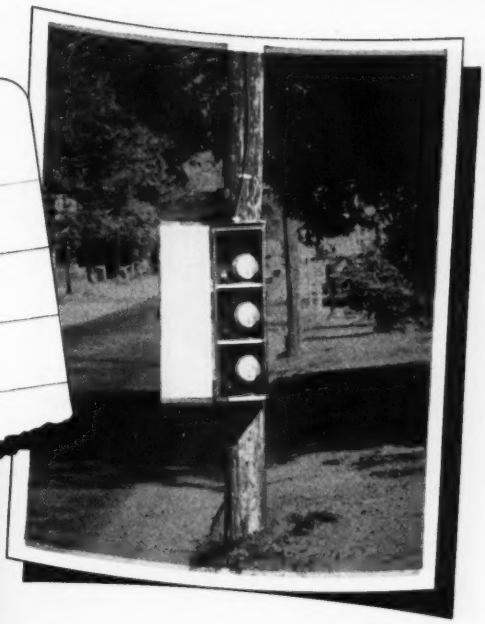
New sizes of the twin-helix Pengo earth augers include 10- and 12-in. actual hole diameters and bring the complete line to 11 auger sizes for hole diameters from 10 to 36 in. The augers are made to fit Highway, Williams and Trackson earth-boring machines. Adapters to make them interchangeable on these and other makes are available.

It is claimed that, in addition to drilling ordinary ground, the augers will bore holes in hardpan, permafrost and frozen ground, decomposed rock and some kinds of caliche and sandstone. The twin-helix design is said to eliminate back thrust against the side of the hole, making it possible to drill with less caving in sandy soil.

Each half helix is equipped with a shank plate, each of which is provided with replaceable cutting points of abrasion-resistant alloy steel. Maintenance costs are said to be reduced because wear takes place on inexpensive replaceable cutting points and pilot bit instead of on the auger itself.

Here's How

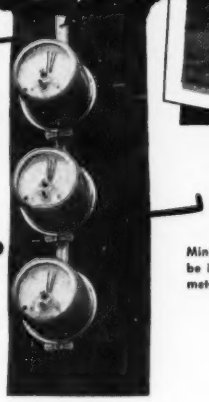
You can get more watts out of your copper—



This Photo Courtesy of Gulf States Utilities Company, Baton Rouge, La.

LINCOLN MINIMAX INDICATING VOLTMETERS

...the *Low Cost* way to obtain continuous voltage information



MiniMax Voltmeters can be installed in standard meter sockets.

To get the most out of your copper, correct voltage levels must be maintained on the basis of *continuous information*. This information can be obtained through the use of indicating voltmeters mounted at load centers along your system.

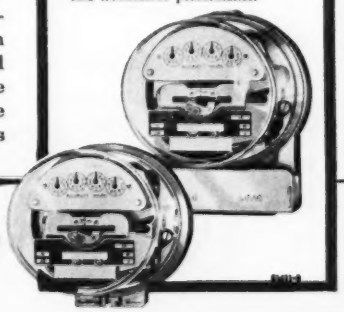
Lincoln MiniMax Indicating Voltmeters provide the most economical way to get the information you need for setting voltage regulators and for solving other voltage control problems. They make the use of graphic meters unnecessary in most cases, and permit inexpensive, *permanent* installations that save the valuable man hours required to make periodic surveys.

The MiniMax voltmeter is equipped with a minimum and a maximum voltage indicator on either side of a pusher pointer which is fixed to the actuating element of the meter. The pointer spreads the indicators apart with changes in voltage. These indicators show the 10-minute averages of minimum and maximum voltages which have occurred since the last resetting. The pointer shows the average voltage at any time. The MiniMax is time lagged so that instantaneous values are not shown.

Bulletin 483 gives full information . . . write for your copy today.

Sangamo J Meters

These watthour meters meet today's requirements and tomorrow's anticipated loads with sustained accuracy, economy of maintenance and troublefree performance.



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SQUARE D's

DESIGN LEADERSHIP

SAFETY SWITCHES

TYPES A*, C and D

30, 60, 100 and 200 Amp. Sizes

40 YEARS DESIGN LEADERSHIP

is reflected in the many design and operating features of this completely new line

Type A switches have full interlock, visible blades and magnetic arc plate as well as a simple, quick-make-and-break mechanism, dead front line terminals, positive pressure fuse clips, multi-spring jaws, silver-plated current carrying parts and removable pressure connectors.

***Types C and D** *resemble* **Type A** *in appearance but differ in construction details*

Write for Bulletin 3100 for further details. Square D Company, 4335 Valley Blvd., Los Angeles 32, Calif.

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RIGHT LIGHTING

● The eyes have rigid requirements in efficient lighting. Smoot-Holman certified illumination meets those requirements with unvarying quality and performance created by superior engineering and skill. Beauty, high efficiency and dependable operation are the hallmarks of the finer lighting equipment that bears the Smoot-Holman label in institutional, commercial and industrial installations.

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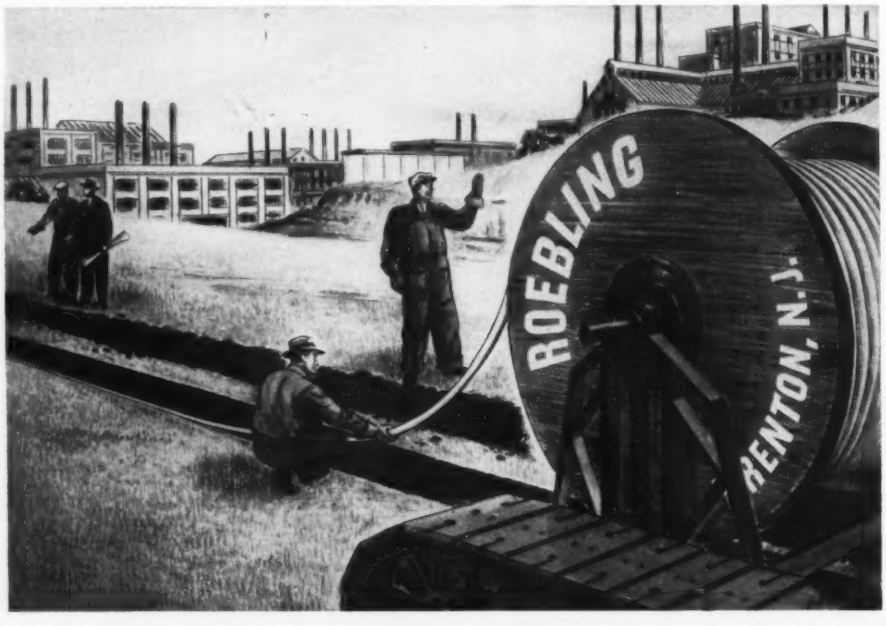
Saves the cost of duct systems

FOR GENERAL POWER SUPPLY and distribution circuits, Roebling Parkway Cable is outstandingly efficient and economical. This cable is laid directly in the ground, in a shallow two- or three-foot trench. And after it's installed, Roebling Parkway will give you thoroughly dependable, uninterrupted service – always.

Roebling Parkway Cable is made in both single and multiple conductor types – either solid or stranded – in a range from 600 to 5000 volts. Both types are furnished with metallic armor or with a non-metallic, NEOPRENE sheath which affords full physical protection.

Large quantities of Roebling's complete line of electrical wires and cables are now required in the rearmament program. You can count on the Roebling organization and distributors, however, for the best they can give. John A. Roebling's Sons Company of California – San Francisco – Los Angeles – Seattle.



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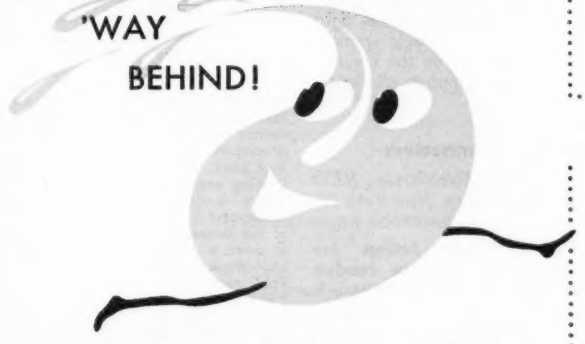
Atlanta, 934 Avon Ave ★ ***Boston,*** 51 Sleeper St ★ ***Chicago,*** 5525 W. Roosevelt Rd ★ ***Cincinnati,*** 3253 Fredonia Ave ★ ***Cleveland,*** 701 St. Clair Ave, N.E. ★ ***Denver,*** 4801 Jackson St ★ ***Houston,*** 6216 Navigation Blvd ★ ***Los Angeles,*** 216 S. Alameda St ★ ***New York,*** 19 Rector St ★ ***Odessa, Texas,*** 1920 E. 2nd St ★ ***Philadelphia,*** 230 Vine St ★ ***San Francisco,*** 1740 17th St ★ ***Seattle,*** 900 1st Ave, S. ★ ***Tulsa,*** 321 N. Cheyenne St

To cut your maintenance cost on heavy duty engines...

SHELL ROTELLA OIL

NOW IMPROVED

NEW SHELL ROTELLA OIL LEAVES THE "SPECIFICATIONS" 'WAY BEHIND!



● "Exceeds every accepted performance standard for oils in its class," the report says. It excels particularly in *piston cleanliness* and in *freedom from ring-groove deposits.* To you, this oil's big edge in its class means a tremendous increase in engine life... a drastic cut in maintenance costs. Yes, a real dollars-and-cents saving. Get the full story on *New* Shell Rotella Oil from your Shell representative.

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The ability to *suspend* contaminants has been deliberately stepped up in *New* Shell Rotella Oil. So has its *detergent* action. Engines stay remarkably *clean.*

EVEN GREATER ANTI-WEAR PROTECTION

New Shell Rotella Oil directly counteracts the acid action of fuel combustion products in the vital top-cylinder zone . . . with correspondingly great reduction in wear.

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SHELL

For all heavy duty engines

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For the past thirty-five years we have supplied industry with brushes. The fine reputation acquired during these years merits the statement that OHIO brushes are rated as tops. Brushes for standard machines are carried in stock. Our Engineering Department will help you with special applications.

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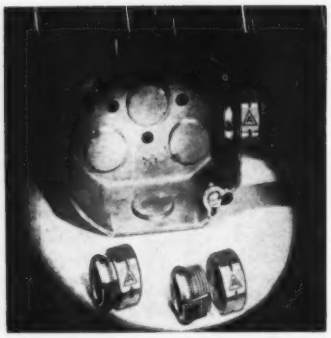

Connector

(10) Appleton Electric Co., 1701-59 Wellington Ave., Chicago 13, Ill.

A new 2-piece connector for ½-, ¾- or 1-in. thinwall conduit is claimed to have advantages of lower cost, faster installation and increased wiring room. The device requires no locknut and tightens with a single wrench. It is Underwriters' approved for inside work or embedding in concrete. It consists of a split-steel body and a cap nut. In use the body is inserted through knockout from inside the box and cap nut finger is tightened on the outside. Thinwall conduit is inserted to shoulder stop inside connector body and cap nut is drawn tight with a few turns of a single wrench. The knurled chamfer on the connector body prevents slipping, eliminates need for a locknut.

Hinged Type Connectors

(11) Gedney Electric Co., RKO Bldg., Radio City, New York 20, N.Y.

These double-hinged fittings are claimed to center cable or conduit automatically when the connector is tightened. They have a full ⅝-in. throat and a range of ⅜ to ⅝ in. on the clamp. Catalog C-4 has a shoulder stop for armored cable. Catalog C-9 has no stop, for non-metallic or rubber cord. Both are malleable iron cast fittings with locknuts of nut stock steel.

Nail Straps

(12) Gedney Electric Co., RKO Bldg., Radio City, New York 20, N.Y.

One-piece malleable iron nail straps are made for armored cable, non-metallic cables, rigid conduit and EMT; are also said to be useful for other strapping purposes, such as with service entrance cable.

Metallic Tubing

(13) The National Supply Co., Spang-Chalfant Division, Etna, Pa.

A complete exterior and interior surface finishing is claimed to increase the durability of Central electric metallic tubing, newest in the manufacturer's line. This tubing is a lightweight steel conduit, adaptable to a variety of raceway services. It is made from cold strip in an electric resistance weld tube mill, and is cut into 10-ft lengths with the ends reamed and chamfered. Finishing which follows includes a sulphuric acid bath, an exterior coating of zinc, an acid bath to brighten the finish, a lacquer coating over the interior surface.

Insulating Material

(14) The Formica Co., 4614 Spring Grove Ave., Cincinnati 32, Ohio

Z-80, a new laminated plastic designed for 60-cycle work, is claimed to have high arc resistance, good dimensional stability and low power loss. It is made of a coarse-weave fabric, bonded with arc-resistant resin; is available in sheet form from 1/32 to 1 in. thick in natural color, semi-gloss finish. It can be molded to a variety of shapes. Z-65, a similar material with a paper base, is being introduced with Z-80.

(15) MOTOR—Designed for use with vertically or horizontally operated belt-driven attic fans, a new motor has been developed by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. The motor-bearing construction is designed to carry thrust loads caused by the weight of motor and pulley, and vertical operation of the motor with the shaft extension up or down is permissible. It is available as a split-phase, 115-v, ¼- or 1/3-hp, type FHT motor, or as a capacitor-start, 115/230-v, ½-hp, type EJ motor. Temperature rating of type FHT is 50 C continuous, of type FJ, 40 C continuous. Both types are externally reversible.

(16) CONTROL—A new Capaciline "straight-line" control announced by Wheelco Instruments Co., 847 W. Harrison St., Chicago, is claimed to be a low-cost device that anticipates the fuel needs of controlled heating equipment. By anticipating the heat transfer lags, it automatically reduces to a minimum the on and off variations of a control instrument above and below the perfect control point, it is stated.

(17) GEARED MOTOR—An improved Slo-Speed unit is of single reduction, "Klosd-Tite" construction for atmospheres containing non-explosive dusts, vapors and injurious foreign materials. An external fan forces cooling blasts of air over the case. Product of Sterling Electric Motors, Los Angeles 22, Calif.

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what you get when you buy

SILVALINE

If you're looking for a longer lived, more weather resistant, more dependable service entrance cable—take a good long look at what Silvaline* Type SE with true URC Weather-proof protection offers you.

1. **GENUINE URC SATURANT**—not an inferior substitute—makes Silvaline's durable fibrous covering indefinitely resistant to weather.
2. **TOUGH NEOPRENE TAPES** cover each individual conductor—increase resistance to heat, moisture and weather . . . in 2 colors, black and red—give the preferred means of conductor identification.
3. **OVER-ALL-BRAID COVERING** provides high resistance to deterioration and adds life to the covering.
4. **SILVER-FINISH COATING** provides clean handling and an attractive surface . . . makes greatly improved base for house paint—permits use of URC saturant and finish without discoloring externally applied paints.

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Write your nearest Anaconda Sales Office or Distributor today. Find out the full details on how Silvaline can do a more dependable job, more economically. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York. *Trademark

the right cable for the job

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There is a Kearney

CON-NEC-TAP CLAMP

to Do the Job

Safely—Efficiently

For All Line Tap Connections *The New Improved* Protected Thread CON-NEC-TAP CLAMP

This new design in a new size, can be used on conductors from No. 6 solid copper to 300 MCM stranded copper, or No. 2 ACSR over rods and will take jumpers from No. 6 solid to 2/0 stranded copper.

The operating screw travels in a sealed grease-filled chamber. This keeps the unused portion of the threads clean and insures easy operation of the screw, preventing binding of clamp to the conductor. A heavy stainless steel spring completely housed between screw and body eliminates the possibility of loosening by vibration and compensates for changes in dimension of conductor.

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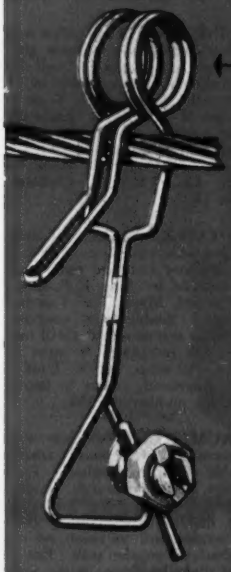
MAYDWELL and HARTZELL, Inc.

Better Construction—*SAFER* Maintenance

FOR HOT LINE TAPS
of Every Description

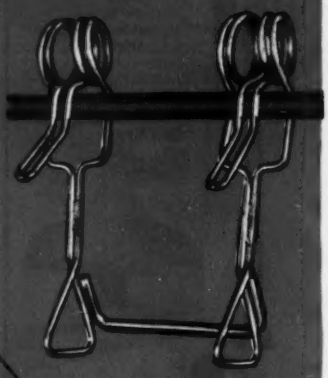


For Low Cost Taps—Use
←SPRING TYPE CON-NEC-TAP CLAMPS

Ideal for tapping small transformers or lightning arrestors this clamp is especially formed and wound to exert a resilient, high pressure contact. Easily installed or removed with a switch or tie stick.

SPRING TYPE STIRRUP →

Should an arc occur in the removal or installation of a con-nec-tap clamp, the use of the stirrup prevents burning or pitting of the conductor. Available for copper to copper connections or plated for all connections.



HI-LINE JUMPER CLAMPS →
with Threaded Ferrule Jumper Terminal

The cut-away view shown at right is a new idea and an improvement in jumper clamps. The jumper head has a threaded recess which receives the threaded stud installed on the end of the jumper cable.

Jumper clamps are now available for use on lines up to 500 MCM.

←New Improved SAF-T-CLAMP STICK

The design features of this new unit provide many advantages. Because there is no operating handle, the lineman can keep his eye on the point of work and function with a much greater degree of efficiency. The simplicity of its construction permits longer lengths with greater rigidity and strength. Less expensive than more complicated models, these sticks are available for immediate delivery.

KEARNEY

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

Better Construction—*SAFER* Maintenance

For the FINEST IN LIGHTING
It's Revere
ELECTRIC MFG. CO. CHICAGO, U.S.A.
All down the Line!

WHITE-WAY PYLON-LITES for Street and Boulevard LIGHTING

AREA AND CLUSTER LIGHTS

750-1000 1500 Watt Enclosed Flood for long range lighting
No. 4200

Elliptor Flood for protective lighting

ULTRA-HIGH INTENSITY RUNWAY MARKER

HINGED FLOODLIGHT POLES
Full Line of Street Lighting Equipment

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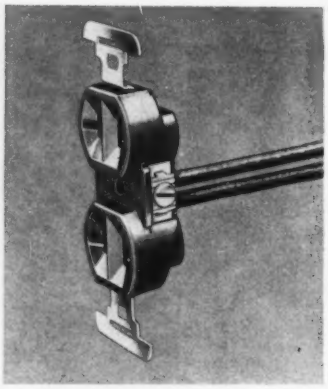


Duplex Receptacle

(18) Monowatt, Inc., 66 Bissell St., Providence, R. I.

A new T-slot, back-wired duplex receptacle has a special wire clamp claimed to eliminate binding screws. Instead of looping and twisting code wires around binding screws, the wires are held securely by wire clamps on both sides of the receptacle. One or two wires can be slipped under the screw-held metal clamp and the ends will not protrude, the manufacturer states.

To mount, about ⅜ in. of insulation is stripped off the end of the wire; wires are slipped into a groove under the clamp and the clamp is screwed down tightly.

Receptacles are made with removable plaster ears and have double-sided spring bronze contacts firmly encased in a thick plastic housing. They come in brown and ivory; are listed by Underwriters' and meet REA and federal specifications.

(19) SERVICE LAMP—A 100-watt rough-service lamp that fits standard wire-guard extension-cord equipment has a 2⅝-in. diameter and maximum length of 5 5/16 in. The new lamp is ¼ in. less in diameter and ¾ in. shorter than the former A-23 bulb. Voltage ratings range from 115 to 300 volts and have corresponding approximate average initial lumens of 1,210 to 750, all ratings are designed for a life of 1,000 hours. Made by Westinghouse Electric Corp., Lamp division, Bloomfield, N. J.

(20) TROFFERS—The Garcy 5500 series, a new line of recessed troffers announced by Garden City Plating & Mfg. Co., 1750 N. Ashland Ave., Chicago 22, includes models for one, two, three or four rows of standard fluorescent or slimline lamps in 4-, 6- and 8-ft sizes. Troffers come with louvers or framed glass or lens bottoms, all hinged. Standard construction is steel, finished in baked white Garlite enamel, but Garzal processed diffusing aluminum is also available.

Spot Light

(21) Swivelier Co. Inc., 30 Irving Place, New York, N. Y.

The Par-Beam Lite, a combination recessed adjustable fixture designed for high-ceiling applications, accommodates either the Par 56 or the Par 46 lamp. Compared to the standard 150-w Par 38 spot, the 300-w Par 56 has eight times the light output and the 200-w Par 46 has four times the light output, the manufacturer states.

(22) SLIMLINE FIXTURES—Nine new louvered fixtures for low-brightness general illumination in commercial and industrial establishments are available in 4-, 6- and 8-ft lengths and with 2-, 3- or 4-lamp units; use T-12 430-ma single-pin lamps. Louver cutoff is 30° crosswise and 30° lengthwise. ETL-approved 430-ma ballasts are used throughout. Made by Mitchell Mfg. Co., 2525 N. Clybourn Ave., Chicago 14.

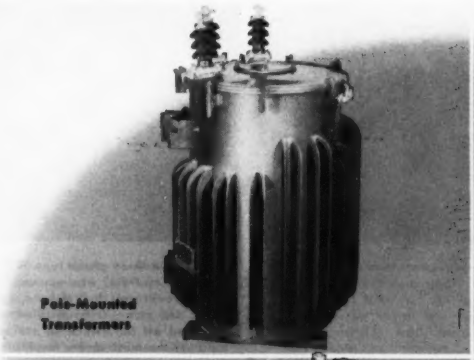
(23) RECEPTACLE—A unit that combines two receptacle outlets molded into a plate that fits any standard outlet box has been introduced by John I. Paulding Inc., New Bedford, Mass. The T-slotted receptacles have double-wipe contacts; large headed brass screws on sides will take No. 8 wire. Each receptacle is rated 15 amp, 125 v or 10 amp, 250 v. Unit is Underwriters' approved; comes in brown or ivory. Catalog number is 1455.

(24) INSTRUMENTS—Full-view type K-24 circular-scale switchboard instruments available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa., feature a new dial and cover structure, said to give maximum readability from the steepest angles and to cause no objectionable shadows on the scale. Except for cover and dial, the design is the same as the original type K-24. The cover is approximately ⅜ in. wider and higher but is within the limits of ASA C39.1. Drilling plan for the two types is identical. Original type K-24 instruments may be converted to the full-view type by replacing dials and covers.

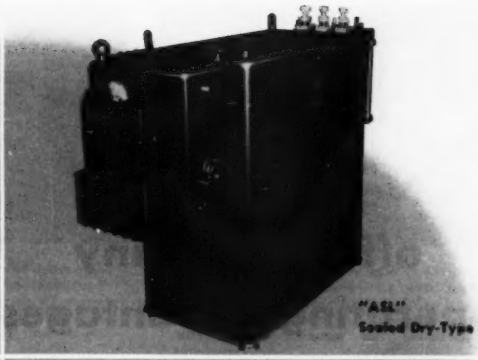
(25) RECORDER—A Multipoint Capacilog, deflection-type strip chart recorder providing up to six permanent records on one chart, is being produced by Wheelco Instruments Co., 847 W. Harrison St., Chicago 7. Measurements may be secured with sensing units producing electric signals, such as thermocouples, radiation detectors, etc.

(26) FIRE PROTECTION—For protection of oil-filled transformers, switches, etc., a water fog producing device developed to use in fixed piping systems has been announced by Fog Nozzle International, division of Akron Brass Mfg. Co. Inc., Wooster, Ohio. These devices use automatic or manual controls or both.

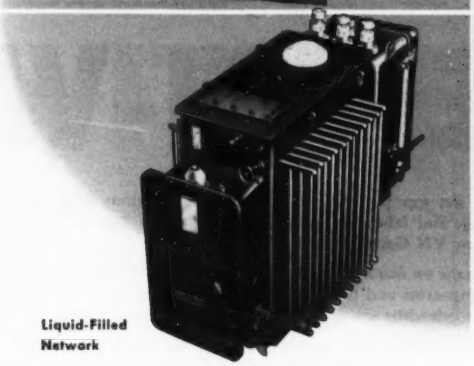
(27) MOTORS—An extended line of type QZE totally enclosed non-ventilated squirrel-cage, induction motors manufactured by Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, includes continuous-duty ratings built in NEMA standard frame 284. Now in production are 7½-hp, 1,800-rpm, and 5-hp, 1,200-rpm motors.



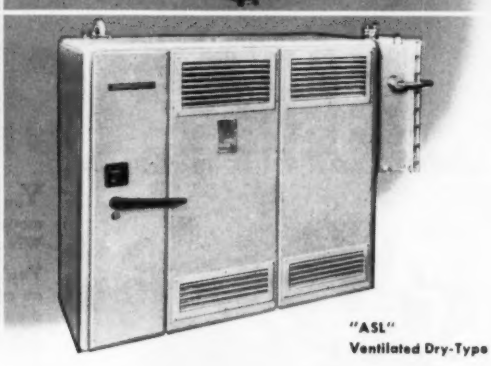
Pole-Mounted Transformers



"ASL" Sealed Dry-Type



Liquid-Filled Network



"ASL" Ventilated Dry-Type

Standardized Transformers make networks pay... *FASTER!*

Sure, network systems pay. The big savings come from continuity of service, flexibility to meet changing demand. But there's another important saving available right now. That's the saving you can realize in transformer costs. Standardization brings production economies that are passed directly to you.

These four standard transformers meet every network requirement:

FOR GENERAL USE. Liquid-Filled Transformers, the workhorse of the network system. Available in sizes 1000 kva and below, 34,500 volts and below, oil or Inerteen® filled.

FOR INDOOR SERVICE. Dry-Type Transformers, ideal for indoor networks . . . lightweight, economical and maintenance-free. Available in sizes 1000 kva and below, 15,000 volts and below.

FOR GREATEST SAFETY. Sealed Dry-Type Transformers give greater safety for crowded areas, or where hazards like explosive gas atmospheres, corrosion or water conditions are not suitable for ventilated dry-type. 1000 kva and below, 15,000 volts and below.

TOPS FOR ECONOMY. Pole-Mounted Transformers for overhead networks. Available in a wide range of sizes, from 150 kva and smaller 15,000 volts and below.

Let us talk them over with you and point out the specific economies that can fit into your plans best. In addition, our complete facilities . . . engineers and calculating boards . . . are available to help you make future expansion more economical. Ask your Westinghouse representative, or write for booklets B-4028 and B-4002A. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.
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NETWORK TRANSFORMERS

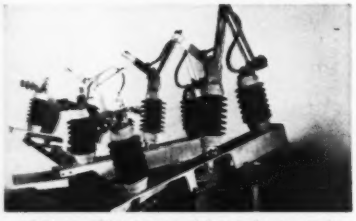
Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

ICE PROBLEMS? Read This...

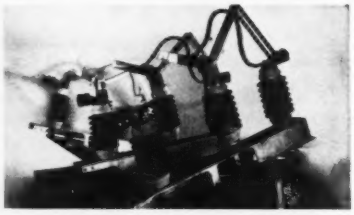
This Chance three phase type WN Switch, with standard controls, was coated in the closed position with over ¾" of hard, clear (bubble-free), ice made with distilled water slowly sprinkled on the switch at various angles to simulate the most severe conditions.

No other switch offers so many operating advantages

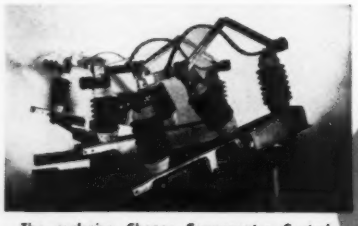
CHANCE WN-VN



"Torture rack" tests proved that performance of the Chance Type WN Switch is not affected by any conceivable warpage of cross-arms. Note side of base is cut away to show control operation.



Note that each switch unit is closing independently of the others. Standard controls were used and no extra leverage was applied. Switch operated easily in spite of the most extreme distortion.



The exclusive Chance Compensator Control mechanism brings all three blades of the switch into completely closed position. No switch or control adjustments were required to compensate for this extreme distortion.

You get top performance under all conditions plus many time, money, and labor saving features when you buy the new Chance WN or VN Gang Operated Switches.

You save on installation because the flanged bases are easy to mount on cross-arms and the interphase shaft can be laid in position after the switch units are mounted—no threading of the shaft is required.

You get dependable operation under all conditions of climate or stress. The exclusive Compensator Control mechanism is housed under the switch base, protected from the weather. This control operates each switch unit independently so that each blade in a three pole switch makes complete contact regardless of warping, twisting, settling or bowing of the wood supporting structure.

A new "crow-bar action" blade, plus the *extra leverage* of the weather protected Compensator Control, makes Chance WN or VN Switches your best buy for performance under heavy ice.

Maintenance time is negligible with WN or VN Switches because all bearings are lifetime lubricated, the flanged bases don't cut into the wood supports and loosen the bolts, and the switch performs properly regardless of structural warpage.

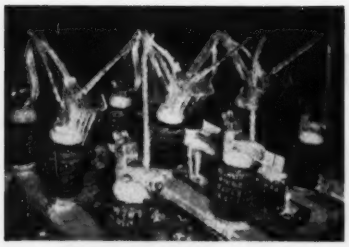
The Compensator Control prevents shock to the insulators and damage to the switch blade in closing, because the closing action is reversed when the control goes through toggle on each individual switch unit. *Slamming the switch closed will not break insulators.* Heavy castings and extra rugged construction also mean long service life without maintenance.

For reliable switching under all conditions, plus time saving installation advantages, specify Chance Type WN or VN Switches. Write for complete information and prices.

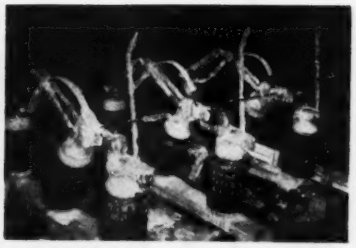
Warped Cross-arms don't affect WN or VN

You know

Various tests were made at temperatures from 20° F. above zero to 16° F. below zero. After 12 hours of sprinkling, hard blows with a hammer only chipped the ice, leaving a white mark. Yet, one man at the controls opened the 3 phase switch without difficulty.



The switch was cleaned and iced again in the fully open position, under the same conditions, with over ¾" of ice on all moving parts of the switch and controls. Operator (background) has started the closing movement.



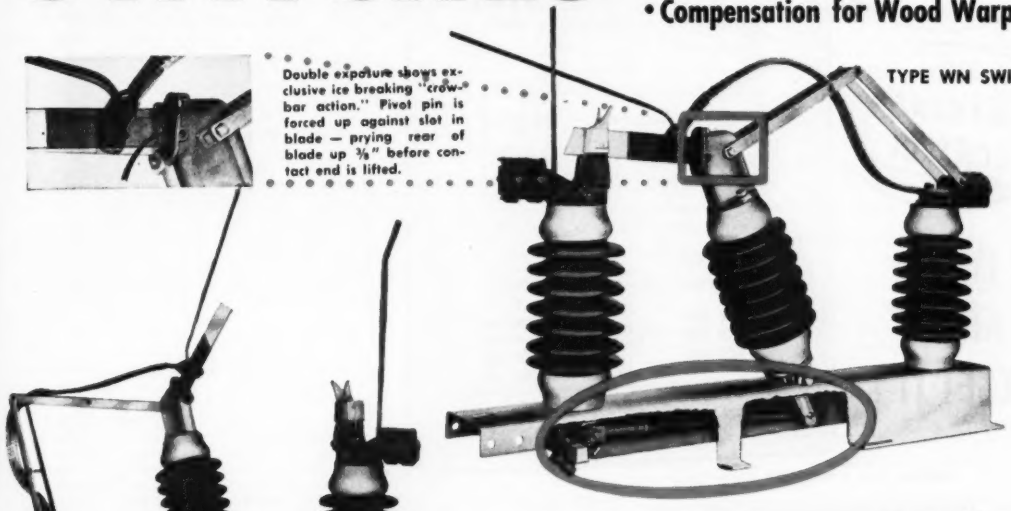
With standard controls one man closed the three phase switch completely with four chopping blows of the blade. There was no damage to the switch in either of these tests and performance was completely satisfactory.

SWITCHES

- New Ease of Installation
- Crow-bar Leverage for Ice
- Compensation for Wood Warpage

Double exposure shows exclusive ice breaking "crow-bar action." Pivot pin is forced up against slot in blade — prying rear of blade up ⅜" before contact end is lifted.

TYPE WN SWITCH



TYPE VN SWITCH

COMPENSATOR CONTROL MECHANISM

Cutaway sections of the flanged mounting base show the weather protected Compensator Control that eliminates closing shock and gives *extra leverage* for smooth, easy operation. This mechanism operates each switch unit independently of the others to give positive, uniform blade contact on all phases. Effect of distortion on the control shaft is negligible, as each blade in a three pole switch arrangement makes complete contact without affecting either of the other two blades.

it's RIGHT when you specify CHANCE

A. B. CHANCE COMPANY CENTRALIA, MO., SAN FRANCISCO, CALIF.

C50-22

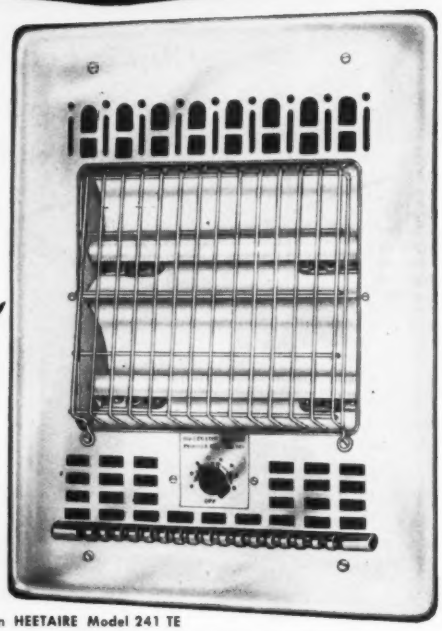
NOW! NEW!

Low Cost . . . Low Wattage

RADIANT Wall-Insert HEETAIRES . . .

AUTOMATIC OR MANUAL CONTROL

SET IT . . . AND FORGET IT !



MARKEL Built In HEETAIRE Model 241 TE

Just set the thermostatic control dial — the HEETAIRE will automatically produce and maintain any desired temperature between 40° and 80° F — immediate healthful infra-red rays — turning itself on and off as needed.

With BUILT-IN THERMOSTATS or MANUAL Controls

1000 — 1250 — 1500 Watts . . . 120 and 240 Volts.
ONLY 17⅜" high x 12⅝" wide !

WRITE for all the details—and the name of our nearest HEETAIRE representative.

Tested and listed under re-examination service by Underwriters' Laboratories, Inc.

MARKEL . LA SALLE
ELECTRIC PRODUCTS, INC. PRODUCTS, INC.
148 SENECA ST. BUFFALO 3, N. Y.

Industrial Oven

(28) Advance Heating Division, Jensen Specialties Inc., 9331 Freeland, Detroit 28, Mich.

This oven combines high-speed radiant heating with temperature-controlled convection for industrial heating and drying operations up to 700 F. It is constructed of low-cost electric heater panels and standardized frame members and uses high efficiency rod-type heaters mounted on insulated oven wall sections, according to the announcement. From 4 to 40 kw of heat may be installed in each 26x84-in. panel, it is stated.

Ovens of any size, shape and heat capacity may be field assembled from standard parts by electric maintenance personnel. Rod heaters of any standard brand name may be specified. The manufacturer provides engineering service. Since no welding is required for assembly, ovens can be enlarged, extended or dismantled, with changes made in the heating transfer rates by addition or removal of standard catalog parts.

(29) **RELAYS**—Bulletin 401 a-c voltage sensitive relays, power type, have been added to its standard line of magnetic relays by Ward Leonard Electric Co., Mount Vernon, N. Y. They are intended for use in a-c circuits where a close voltage differential between relay pick-up and drop-out is needed; consist essentially of an insulating base on which are mounted a power-type bulletin 103 or 130 a-c magnetic relay, with S.P., N. O. contacts and a small saturable reactor. The relay coil and reactor are connected in series.

(30) **ALTERNATOR**—American Electric Motors Inc., 4811 Telegraph Rd., Los Angeles, is making a single- or 3-phase, high-frequency induction alternator equipped with an electronic exciter regulator. Accuracy of voltage regulation is said to be within plus or minus one per cent. This equipment can be supplied independent of line frequency fluctuations by making it self excited through high vacuum rectifiers. To secure variable frequency, the alternator is driven by a Sterling Speed-Trol electric power drive.

(31) **SMALL CAPACITORS**—New ways of mounting subminiature metal-encased paper capacitors and a complete line of subminiature 125 C capacitors have been announced by the Sprague Electric Co., North Adams, Mass. Details are available in the manufacturer's bulletin 213A.

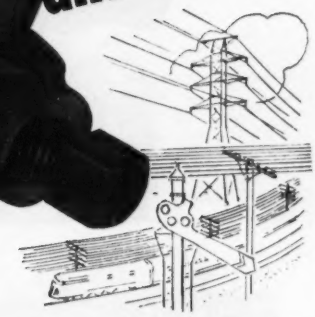
(32) **DOOR SEAL**—A plasticized vinyl gasket designed to give a better door seal and reduce operating costs is being used on Westinghouse refrigerator models, according to a recent announcement by the manufacturer.

(33) **MELTING POT**—A solder pot designed for a maximum temperature of 1,200 F to permit tinning Formex wire without stripping has been announced by Dee Electric Co., 1101 N. Paulina St., Chicago 22. It is equipped with an adjustable thermostat.

For LOW-COST LIGHTNING PROTECTION that's PERMANENT use Copperweld Ground Rods and Clamps

Struck 12 times during a single storm and 48 times in one year, the Empire State Building disproves the old saying that "lightning never strikes twice in the same place."

LOOK FOR THE NAME "COPPERWELD" — IT PROTECTS YOU!



YOU NEVER KNOW WHERE, WHEN, OR HOW OFTEN LIGHTNING WILL STRIKE . . . but you can secure safe, permanent and economical grounding protection when you install Copperweld* Ground Rods and Clamps. For every grounding application requiring the use of driven electrodes, these superior ground rods offer you these important advantages:

1. *Molten-Weld*—Permanent interlocking weld between the copper and alloy steel eliminates possibility of electrolytic action. No other ground rod has this inseparable union, accomplished only by the proved Copperweld Molten-Welding process.
2. *Ease of Installation* — Copperweld's extra-strong alloy steel core assures rigidity and easy driving even through very hard soils.
3. *High Conductivity*—Copperweld's thick sheath of pure copper provides excellent electrical conductance. Copper-to-copper contacts throughout insure low resistance.
4. *Protection Against Rust* — Copperweld's heavy copper armor permanently protects the alloy steel core against corrosion.
5. *Greater Economy* — Longer service life with no maintenance costs.

Start now to reduce outages and insure continuity of service by using Copperweld Ground Rods and Clamps. They provide safe, permanent, low-cost grounding protection at all types of locations—at poles, at towers, at power stations, at substations, at buildings — and for all grounding purposes.

COSTS YOU LESS — Copperweld — BECAUSE IT LASTS LONGER

MADE BY COPPERWELD STEEL COMPANY GLASSPORT, PA.

PACIFIC COAST OFFICE: MONADNOCK BLDG., SAN FRANCISCO

*Trade Mark

Stocked And Sold By:

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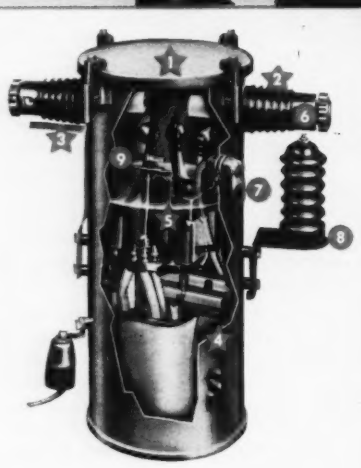
And All Their Distributors



1. Completely round tank and cover.
2. Extra rugged bushing with 2-way disconnect clamp and nonbreakable "Enrup" clamping knob.
3. Interchangeable, high-voltage, neutral bushing strap for wye system.
4. New "Coastal Finish" adds years of service life.
5. Inhibited Wemco C-I Oil life increased threefold.
6. Series air gap isolates arrester from line voltage.
7. New breaker handle with emergency control.
8. New wall-mounted, porcelain-clad De-ion arrester with high surge current capacity.
9. Tap changer handle located above oil level.

"CSP" Transformer RW Tank
5,000 volts and below
100 kva and smaller

They're NEW!

5 More Features that cut maintenance

Five great improvements in the Westinghouse "CSP®" Transformer:

1. **New round tank**
2. **New high-voltage bushing**
3. **Simplified stocking**
4. **New "Coastal Finish"**
5. **Inhibited Wemco C-I Oil**

Now the "CSP" Transformer cuts distribution costs even more. Like all Westinghouse "CSP" (Completely Self-Protecting) Transformers, the new Model "RW" has both thermal and lightning protection built in.

★ **The completely round tank** provides the most effective seal possible . . . allows more free working space between transformer and pole.

★ **New rugged high-voltage bushings** are 3 times stronger . . . leads are easier to connect and tighten with nonbreakable "Enrup*" clamping knob.

★ **It's convertible.** Stock only Class B-1 transformers for wye systems with a spare supply of arresters. To convert to Class A for Delta systems, remove the neutral bushing strap and replace with a high-voltage De-ion® arrester.

★ **New "Coastal Finish"** provides greater resistance to chalking, cracking and rust. More than doubles protective life of the finish . . . adds years of service before repairing and repainting.

★ **New Wemco C-I (Inhibited) Transformer Oil . . .** greatly increased service life. Low viscosity . . . freedom from acids, alkali, corrosive sulphur and sludging . . . and resistance to emulsification are all maintained at least 3 TIMES LONGER.

Meets ASA and EEI-NEMA standards. Available with cover-mounted bushings, in ratings above 5,000 volts, 100 kva and smaller.

Westinghouse Distribution Transformers are also available in conventional models. For further information call your Westinghouse representative, or write for DB-46-100 "CSP" Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70582

*T. M. Reg. U. S. Rubber Co.

YOU CAN BE SURE . . IF IT'S Westinghouse

"CSP" DISTRIBUTION TRANSFORMERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

Lower UNIT COST with UNION'S New Work INSULATED BOXES

1 Competitively priced.

2 Minimum installation cost.

3 No box grounding required.

4 Prompt delivery.

5 Safest and best for general home wiring.

6 Ideal for highly competitive housing projects.

UNION INSULATING CO.
PARKERSBURG, W. VA.

BULLETINS ETC.

(34) CONNECTORS — Pressure terminals and connectors for applications on all wire sizes from No. 26 through 250 MCM are listed in the new 40-page Sta-Kon bulletin 61 of the Thomas & Betts Co., Elizabeth 1, N. J. One section gives a complete listing of armed forces procurement numbers, with corresponding T&B catalog numbers. Pages listing specific types of Sta-Kon connectors and terminals give complete dimensions in simplified arrangement.

(35) RESISTORS—A resistance element triply insulated from the frame by two thicknesses of mica-fiberglas-silicone, and high-strength refractory porcelain insulators are features claimed for new resistors announced by Mullenbach Electric Mfg. Co., 2300 E. 27th St., Los Angeles 58. Descriptive folders giving electrical and mechanical specifications and listing prices are available from the manufacturer.

(36) TAPES FOR TELEVISION—Scotch brand electrical tapes for television are described and illustrated in an 8-page booklet prepared by Minnesota Mining & Mfg. Co., 900 Farquier Ave., St. Paul 6, Minn.

(37) INDICATOR — A new instrument, the model 1020 strain gage indicator is described in a data sheet from Cole Instrument Co., 1320 S. Grand Ave., Los Angeles 15, Calif. This instrument is designed for measurement of strain in conjunction with standard resistance wire strain gages. Six sets of binding posts and a gage selector permit rapid successive readings of six strain gages that may be attached to various parts of a complex structure. Two ranges are provided: 1,000-0-1,000 and 10,000-0-10,000 micro-inches per inch. Accuracy is 0.1% of full range.

(38) GEAR-HARDENING MACHINE — Data on the new radio-frequency gear hardening machine, the Inductall, manufactured by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa., are contained in bulletin B-5259. Adaptability in handling spindle, spur and cluster gears and shafts for either through or contour hardening is explained.

(39) LIGHTING FIXTURES — New data sheets have been released by Day-Brite Lighting Inc., 5411 Bulwer St., St. Louis 7, Mo.

(40) AIR CONDITIONING—A 20-page planning guide gives technical information in simple terms. The booklet covers five vital functions of an air conditioning system; what to expect from the system; factors to consider in planning; where and when to use a "within-the space" conditioner, a factory-assembled central-plant-type unit or a field-assembled system. Booklet B-5159 is available from Westinghouse Electric Corp., Sturtevant Division, 200 Readville St., Hyde Park, Boston 36, Mass.

(41) INSTRUMENTS — Megger ground resistance and earth resistivity measuring instruments are treated in a recent 20-page bulletin available from James G. Biddle Co., 1316 Arch St., Philadelphia 7, Pa.

(42) PLASTICS—A 1951 catalog of laminated plastics has been published by Taylor Fibre Co., Norristown, Pa. The 62-page catalog covers vulcanized fiber phenol fiber and special luminates, design and machining and Taylor engineering and research facilities.

(43) FLOODLIGHTING—A new Abolite catalog and handbook is offered by the Jones Metal Products Inc., West Lafayette, Ohio, to users of commercial and industrial floodlighting.

(44) SWITCHES—A catalog sheet on Linemaster Compact and Twin Compact switches has been issued by Simonds Machine Co. Inc., Southbridge, Mass.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after June 1

Please send me, without obligation, the new product information or catalogs described on the following pages and identified by numbers circled below:

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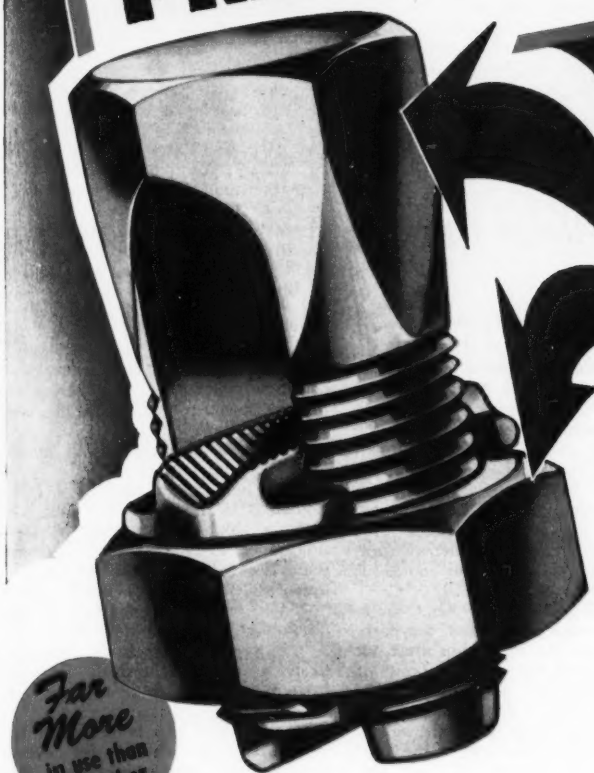
Here's the MOST PRACTICAL design



LARGER SURFACES

to grip with wrenches from ANY ANGLE — using either a socket or open-end wrench.

MORE STRENGTH. In competitive torque tests, Penn-Union Split-Bolt Connector withstands 15% to 55% higher clamping pressures.

MAXIMUM CONTACT provided by V-groove; conductors protected by bevelled slot.

PRECISION MADE, with rigid inspection. Smooth accurate threads assure maximum pressure — permanently maintained.

Far More in use than any other

For taps, dead-ends, parallel connections, etc., in any location. Can be furnished in bronze or aluminum. Re-usable over and over.

With or without retainer.

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PENN-UNION ELECTRIC CORPORATION, ERIE, PA.

PENN-UNION

ELECTRA'S HUSBAND

"THAT must be a thrilling book you're reading," Electra said one evening recently. "You haven't paid a bit of attention to the radio since dinner. What is it, a new novel?"

"No, but it is one of the most exciting and at the same time most frightening books I've ever read," I answered. "The name of it is *The Operational Code of the Politburo** and it tells in plain understandable language just what the political strategy of Communism is, and it sets down the basic rules by which the Communists operate. The book is the outcome of a research project by the Rand Corporation for the Army Air Force."

"From my standpoint, that ought to be dull reading," Electra commented. "I think I know what the Communists want, and the steps they propose to take to win world domination appear obvious."

"That's what you think," I continued. "However, you and everybody else who is aware of the Communist menace ought to read this book because it spells out a lot of the ideology and the resulting operating rules in a manner that none of us ever appreciated or understood. Two things about it shock me. One is the manner in which they have taken some of the plain and simple policies and rules of good political conduct and have prostituted them to their own ends. And the other is the degree to which some of our own boring burcaucrats are following the same techniques."

"Who do you mean? Hiss and his crowd in the State Department?"

"No, I mean that small hard core of bureaucrats who for thirty years have been working to federalize the light and power business of this country," I answered. "The revolutionary philosophies and techniques outlined in this Communist procedural manual are identical with those which these bureaucrats have used over the years. The persistence, the pressure, the perseverance, the flexibility and the deception of the Communists are paralleled by the tactics of the group which never has let up in its attack on the light and power industry.

"Let me pick out some of the rules to show you what I mean. I've marked the book up from cover to cover just to point up for myself some of the most revealing Communist precepts and procedures. And incidentally the entire book is documented with quotations from the writings and speeches of Lenin and Stalin. Here are a couple of significant statements from the chapter headed 'Means and Ends':

No Holds Barred

" 'The fundamental law is to do all that enhances the power of the Party, the great and only instrument in the realization of communism, the great and only goal.'

" 'A Communist who says that one should never dirty one's hands . . . that he is going to build a Communist society with clean hands, is an empty phrasemonger.'

" 'In deciding upon what statements to make both within the party and without, the leadership must not be influenced by considerations of truth. Only the impact of these statements should be considered.' "

Electra rose from her chair, walked across the room and pushed the "off" button on the radio. "I can't pay attention to what you are reading with that thing blaring. How can you concentrate?"

This was old ground for argument. Ignoring it, I continued:

"In the chapter, 'Calculus of the General Line,' there are a couple of salient rules. One says, 'Although the Party is not explicitly affirmed to be infallible, it is, in fact, believed to have a near monopoly of correct estimates and forecasts.'

"The other goes like this, 'The Party must be able "to hear the grass roots grow beneath the soil," i.e., to make predictions which may seem absurd to "political philistines" but which will turn out to have been correct.' "

"Well, you've not frightened me yet and moreover some of our own politicians are not above working by the rules you've quoted up to now," Electra commented.

"I've just been leading up to some of the really tough rules. Let me read you a couple of more notable ones and then I'll give you two or three really radical ones. Listen to these:

" 'The Party must be able to delay punitive measures until the most useful moment.'

" 'Once the Party has created sufficiently strong boundaries between itself and its environment, it may enter into an expedient relation with any outside group.'

"Both of those rules are used from day-to-day by the federal power grabbers. In fact some of the contracts which they are offering to private power companies fit the last rule perfectly."

"You said something about tough ones," she interrupted.

"And here are a couple," I continued. " 'If the Party does not use violence against its enemies, it lays itself open to violence from its enemies. It is a lesser mistake to use too much violence than too little.'

" 'The only good neighbor is the absolutely controlled neighbor.'

" 'In periods of crisis the Party is likely to advance abruptly from a position of weakness to one of strength.'

"I think that this book should be made required reading for every business man who thinks that the world emergency is diminishing. And every member of Congress who sympathizes with President Truman's 'red herring' policy ought to read it also. Only complete annihilation of the leaders will stop the march of Communism."

"Don't get dramatic," Electra said. "I believe you. And if you have finished with the book, I'll read it too. I know a couple of pinkish people I can needle with some of the things in it."

"Yes, antidotes for poison are often administered by needle."

---

* *The Operational Code of the Politburo*, by Nathan Leites, the Rand Corporation, 96 pages, 6x9, McGraw-Hill Book Co. $3.

Expanded Assembly Lines Increase CURVACORE Transformer Production

IT IS NOW EASIER to obtain *Curvacore* distribution transformers. Production facilities are expanded. You'll be able to take advantage of the inherent benefits of *Curvacore* transformers sooner.

Curvacore transformer design improvements give more performance for your distribution dollar. Cold rolled oriented steel strips have high flux carrying capacity and low hysteresis loss. The core steel is wound, shaped, annealed and cut into two turn lengths. Then each length is fed through the coil structure so that it retains its original core shape.

You benefit from these improvements:

1. 50% lower exciting current
2. Better ratio of losses
3. Improved short time thermal capacity
4. Size and weight reduced 15%
5. Regulation improved up to 15%

This wound core design provides a more efficient path for the magnetic flux, resulting in low exciting current. The *Curvacore* transformer has better thermal performance, too! Increased cooling area within the windings reduces the copper-to-oil temperature gradient, improves regulation and adds years to service life. Weight is reduced, making the *Curvacore* transformer compact, easy to handle and to install.

Former Advantages Retained

In addition to *Curvacore* transformer design you still get *Spra-Bonderized* tanks with 3-coat baked-on finish of alkyd-resinous paint; simplified high voltage angle bushings with handy chuck type connectors; sturdy tank construction; high quality craftsmanship throughout.

For more information about the *Curvacore* transformer, contact your local Allis-Chalmers district office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3366

Typical core and coil assembly shown above. Present ratings of Curvacore transformers are 25 kva and below. Others will be available shortly.

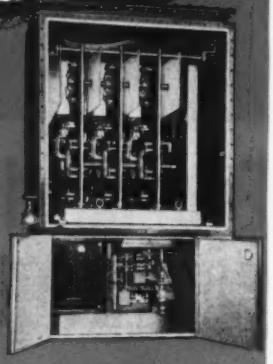
Curvacore is an Allis-Chalmers trademark.

ALLIS-CHALMERS

MOLONEY VOLTAGE REGULATING APPARATUS . . .

. . . THE ANSWER TO YOUR REGULATION PROBLEMS!

Moloney Step-Type Feeder Voltage Regulators, Regulating Transformers and Load Ratio Control Transformers have been chosen by many system engineers to solve their regulation problems after considering the following advantages of Moloney Load Tap Changer with which they are equipped.

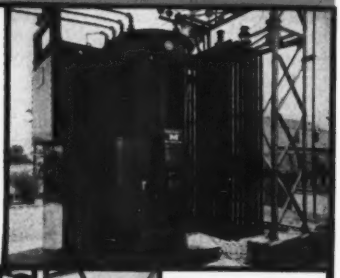


Moloney three-phase Load Tap Changer with automatic controls. Tap assembly contains Tap Selector Switch, Load Transfer Switches and Reversing Switch. Motor drive and auxiliary equipment are at lower right. Automatic controls are at lower left. Moloney Automatic Control equipment features a super-sensitive voltage regulating relay and an electronic time delay circuit. A complete line of remote-manual and automatic controls and associated equipment is available.

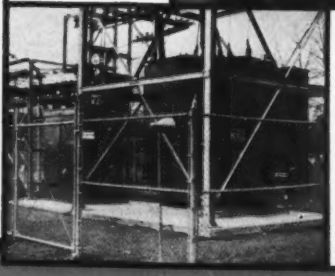
1. RELIABILITY . . . The tap selector switch is mechanically driven by Geneva gears to assure correct positioning. Arcing is prevented on this switch since the load transfer switch assumes the entire load before the selector switch contacts are opened and maintains this load till after the selector switch contacts close in the next tap position. The load transfer switch, which is the only switch required to transfer load current, is provided with accelerating springs and is driven by Geneva gears. This assures quick break of the current arc.

2. LOW MAINTENANCE COST . . . Contacts which transfer load current are accessible for inspection and maintenance through an access opening in the Load Tap Changer compartment cover. Arcing duty is imposed on only four stationary contact tips per phase as contrasted with eighteen in mechanisms performing both tap selection and load shifting duties on the same contacts.

3. LOW LOSSES . . . The Moloney Load Tap Changer incorporates an ingenious method of by-passing the switching reactor to eliminate reactor copper losses. These losses are eliminated in all operating positions on 1¼% step apparatus and in half of the positions on ⅝% step apparatus.



Load Ratio Control Transformer rated 3000 Kva, 13200 volts Delta to 4330Y/2500 volts, equipped with automatically controlled Load Tap Changer.



Load Ratio Control Transformer rated 3000 Kva, 13500 volts Delta to 4330Y/2550. Load Tap Changer equipment provides plus or minus 10% regulation in 32-⅝% steps.

MOLONEY ELECTRIC COMPANY

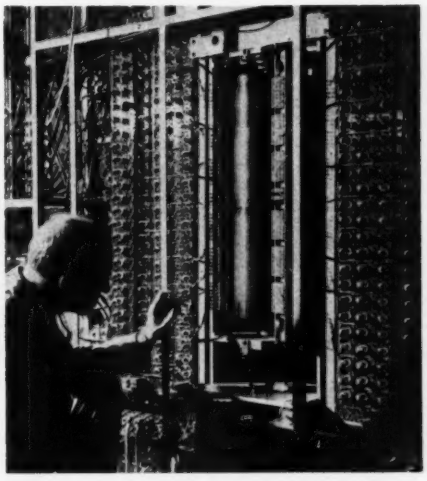
Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control Transformers • Step Voltage Regulators • Unit Substations

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONT., CANADA

MARCH, 1951 Vol. 106, No. 4

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.



Cory Hall is imposing new structure on Berkeley campus. Right: Prof. P. L. Morton at magnetic memory drum of digital computer

THEY'LL BE BETTER ENGINEERS

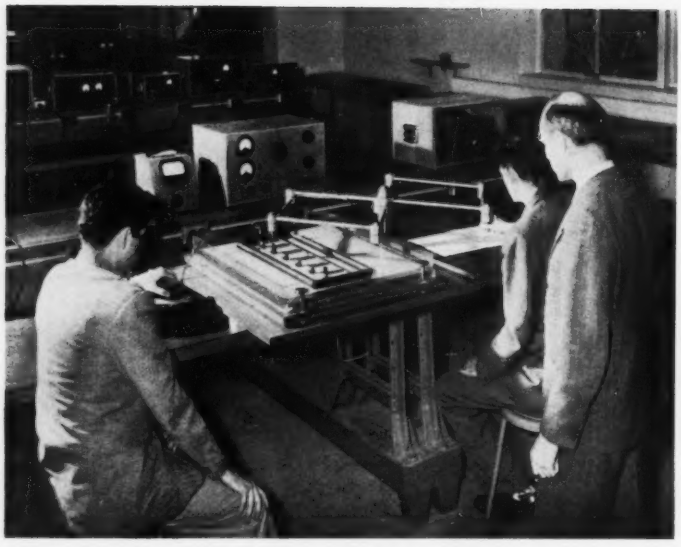
Because Cory Hall at University of California provides students with diverse and ultramodern electrical engineering facilities

Charles F. Dalziel
Professor of Electrical Engineering

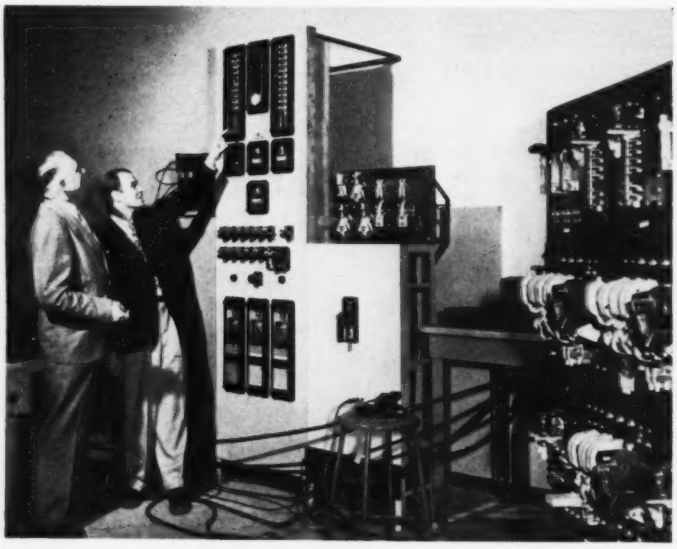
The new electrical engineering building on the Berkeley campus of the University of California is dedicated to the memory of the late Clarence L. Cory, who for nearly four decades served on the Berkeley faculty, including a quarter of a century as dean of the College of Mechanics. Located on the northeast corner of the campus behind Hearst Memorial Mining building, and just below Founders' Rock, the fire-resistant, reinforced concrete four-story building is a fitting memorial. The building, with furniture and new equipment, represents an investment over $2 million. Facilities are modern and adequate in every respect to care for the growing student enrollment and the requirements of Western industry for years to come. It is the latest of three new electrical engineering buildings and laboratories to be added by Western state universities—Oregon State College at Corvallis and the University of Washington at Seattle being the other two (EWEST, December, 1950, p 76, and March 1951, p 68).

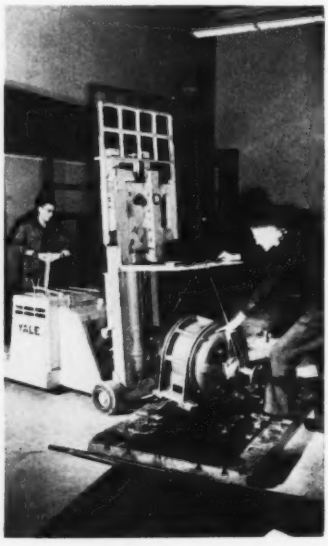
The ground floor covers the entire site while the other floors have a central light well to provide natural light for inside offices. The useful floor area is 94,000 sq ft. In addition to the Division of Electrical Engineering, the building houses a Standards Laboratory and a large machine shop administered by the Institute of Engineering Research. Ample facilities are provided for student and individual staff research, special services to industry, and sponsored research projects. At the present time, sponsored projects include advanced studies concerning microwaves, antennas, electronic computers and photometry. The Standards Laboratory will be the most complete laboratory of its kind on the Pacific Coast. It will contain primary or secondary standards of time, length, weight, as well as those concerned with photometrics, acoustics, temperature and electricity. The laboratory will have calibration facilities adequate for both educational purposes and industry. These activities enhance instruction by providing close contacts with the profession. Formal instruction in electrical engineering leads to the B.S., M.S., M.E.E., E.E., and Ph.D., degrees.

The building consists of a partially excavated basement, ground floor, three upper stories and a flat roof with a penthouse. The upper floor was left unfinished to provide space for future expansion. Present major physical facilities include 44 offices, 9 classrooms seating from 40 to 117 students, 11 instructional laboratories, 10 research laboratories, 4 student computation rooms, 4 instrument



Field distribution study under Prof. Wilson Pritchett. Right: Student shows use of demountable panels for instruments and controls





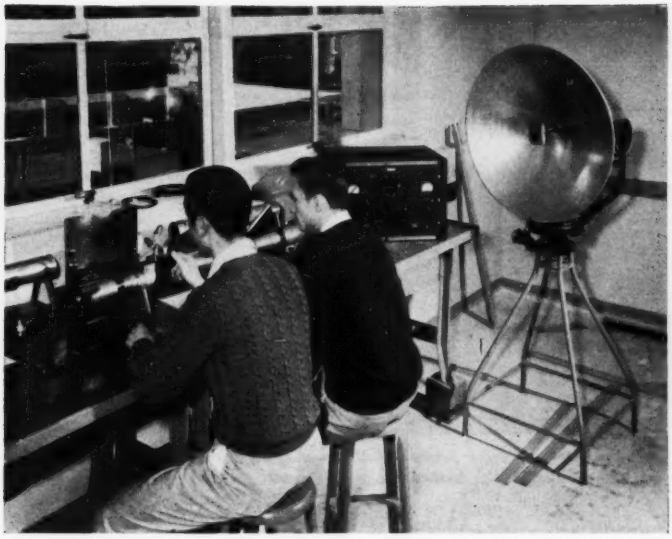
Prof. T. D. Graybeal and Clive Baugh, PG and E, inspect supervisory control panel. Right: Fork lift truck handles heavy machinery

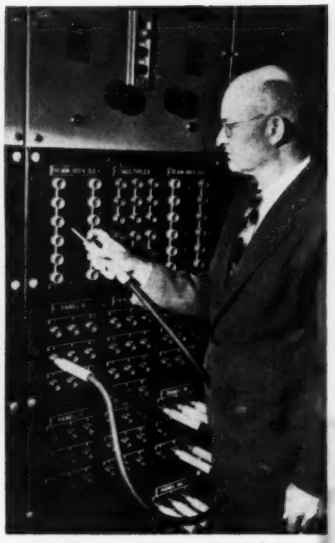
rooms, student shop, staff conference room, photographic darkroom, storage battery room, basement machinery room, 3,000-kva 12,000- to 480-volt substation, and various heavy and precision machine shops and storage rooms.

Classrooms are located along the north and south walls of the first floor; each has a distribution panel mounted underneath the lecture desk, which contains various electrical outlets and arrangements for connecting circuits from the various instructional laboratories and experiment stations. It is anticipated that these provisions will greatly facilitate instruction by providing a ready means of conducting lecture demonstrations in the classrooms.

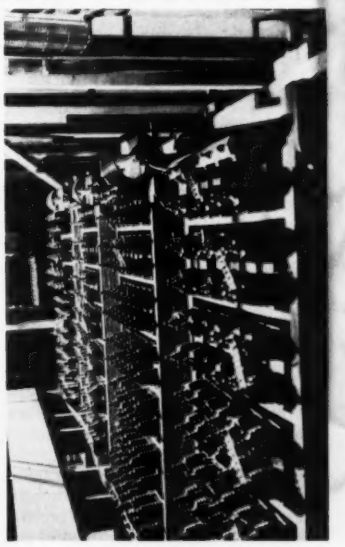
The interior finish of the building is tinted plaster or concrete. Acoustical ceilings are installed in all offices, classrooms, corridors, vestibules and computing rooms. The exterior finish is form-finished concrete. Student lockers installed flush with the walls are provided on the ground and second floors. Large display cases are also recessed in the walls of the corridors on all floors, and it is anticipated that properly activated displays will constitute a valuable contribution to instruction as well as provide interesting exhibits for visitors.

The accompanying pictures take





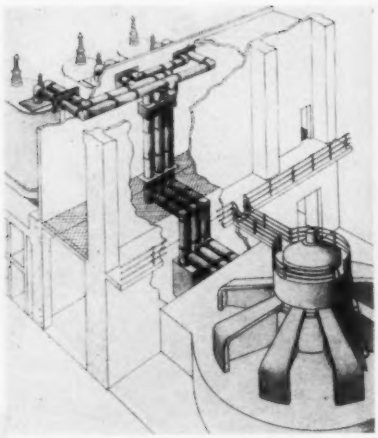
Measuring wavelength of microwaves in electronics laboratory. Right: Prof. Dalziel demonstrates his new safety plug for test leads

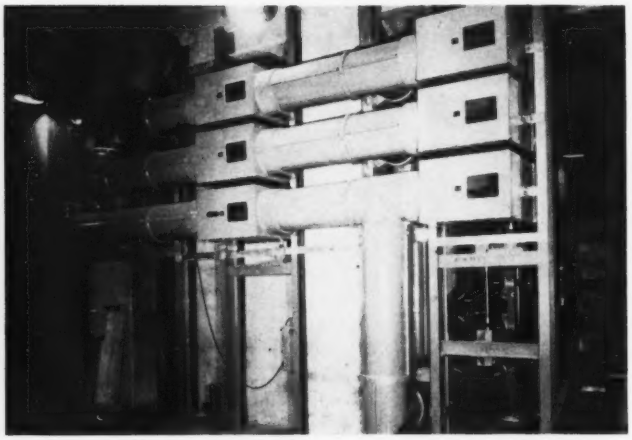


Graduate students obtaining microwave antenna patterns on roof of building. Right: Part of the bank of condensers for resnatron

the reader on a short trip through the building, and illustrate both regular laboratory instruction and research in progress. In the layout and design of the laboratories every effort has been made to provide adequate facilities with emphasis given to flexibility and safety. Student work benches in the machinery and control laboratories are provided with angle iron racks; these will accommodate a variety of demountable panels containing instruments, relays, circuit breakers, magnetic contactors and other test apparatus. So far as possible, the panels are dead-front. This type of construction contributes much to flexibility and adds greatly to the safety of the students. Power plug-leads for the switchboards and distribution panels, spaced throughout these laboratories, are of special design with safety again being a determining factor. As illustrated, the plugs are provided with spring-actuated insulated tubes that completely shield the live contact tip even while it is being inserted in the receptacles.

Many years of teaching experience of the large staff of E.E. instructors has gone into every detail of the arrangements with the result that the facilities of Cory Hall will rate high among electrical engineering buildings of the leading universities of the country.





1—Original isolated-phase generator bus arrangement in Grand Coulee power plant will be tapped by similar type of bus to serve pump motors. 2—Ls in original bus are here converted to Ts to form start of pump bus extending up face of dam to pump house

Isolated-Phase Bus Serves Coulee Pumps

Six 13.2-kv 4,300-amp buses, each serving two 65,000-hp motors from one 108,000-kw generator were required. Bus consists of 7½-in. copper tube completely enclosed in air-insulated housing

Ralph G. Lockett

I-T-E Circuit Breaker Co.
Denver, Colo.

Grand Coulee pumping plant, with six of its ultimate twelve 65,000-hp motors to be installed in 1951, is as spectacular in many respects as the famous Grand Coulee Dam and power plant itself. The pumping plant will raise water from the reservoirs created by Grand Coulee Dam to irrigate half a million acres of land in eastern Washington. The pumping plant is the world's largest; contains the largest pumps and synchronous motors ever built, and has a most interesting 13.8-kv bus from generators to pump motors. This bus is the subject matter of this article.

Bus conductors were required to serve a load of 4,300 amp for each two pump motors, to be transmitted from generators, through the power house to the base of the dam outdoors, up the face of the dam, into the pump house, and through the individual circuit breakers to the motor terminals. For these runs of approximately 1,000 ft, I-T-E isolated-phase bus was chosen by the U. S. Bureau of Reclamation.

This isolated-phase type of bus is used from generators to transformers throughout the Grand Coulee power plant. The arrangement is shown schematically in Fig. 1. At the lower end of the principal vertical run are three single-phase Ts (Fig. 2) which functioned as Ls in the original generator-transformer connections. These three Ts are shown being converted to form the start of the pumping bus. To the right of the Ts is a sectionalizing disconnect switch, key interlocked with a grounding switch shown on the right. The pump bus, extending directly away from the camera, soon turns to the right through a bus gallery and emerges through a weatherproof deck plate to ascend the face of the dam (Fig. 3). This picture of a portion of the main bus for one circuit was taken before the protective cylindrical aluminum split covers were installed.

At the end of the power house the three-phase runs angle up the face of the dam. At this point the outdoor portion of the bus (Fig. 4), extending up the face of the dam, begins. In Fig. 4 is shown the aluminum structural framing built to carry the three present circuits. It is designed so that it can be extended to carry three more buses. It is built to coordinate with the access stairways provided in the concrete shown in Fig. 5.

Horizontal runs in the pump house extend to the metal-clad circuit breakers (one for each motor) and then to the motor terminals. These are essentially duplicates in cross section of the power house portion. The bus, of course, splits into two 2,150-amp runs, just ahead of the circuit breakers.

General Design

Requirements for the initial generator bus in the power plant were based in general on the original Hoover Dam design, which used copper sheet box housing around each phase, with a single grounded ⅛-in.-thick cooper sheet between phases. This is the so-called "segregated-phase" design. It was found, however, that "isolated-phase" design could be furnished to provide an individual sheath around each phase, with an air space between phase housings. This construction was selected and installed for all 18 generators in Grand Coulee. The pump bus is essentially a long extension on six of the sets of generator leads. Considerations that led to the use of isolated

3—Looking along partially completed bus up face of dam. 4—Present aluminum framing for supporting three buses will later be extended to accommodate six buses for 12 pumps. Aluminum will blend with concrete of dam. 5—Construction view. USBR photos

phase bus in the generating plant applied on the extensions. The most important considerations are:

1. Air space between two grounded phase covers prevents possibility of phase-to-phase fault.

2. Low loss in hollow conductors and metal covers permits tight gasketing without ventilation of enclosure.

3. Elimination of organic insulating material permits operation at high temperature caused by overload or effect of the sun's rays on the outdoor portion.

Amplifying on these points:

1. Isolation: It is obvious that if an arc from conductor to housing burns through a *single* sheet to the space surrounding another phase—ionized gases passing through the opening can readily start a phase-to-phase fault. An air separation of only several inches between *two* housings is effective in preventing such action. Phase-to-ground faults are kept to low value by proper design of the grounding connections.

2. Low Loss: The circular housing of ⅛-in.-thick conductor aluminum is interrupted electrically by an insulating gasket approximately every 8 ft of running length. This prevents the generation of long path sheath currents. In addition the housing, being round and about the same shape as the field surrounding the conductor, generates little heat. Moreover, the round housing is the best choice from the standpoint of resisting internal pressure should a fault occur. Since ventilation of the enclosure is not required, tight gasketing is used. Dust and moisture are thus excluded and the construction indoors is used without modification outdoors.

3. Temperature: During the summer months, direct sunlight will at times raise the temperature of the outdoor portion above AIEE standard limits—even at no load. The structure is essentially metal and porcelain and the insulation is porcelain and air. Therefore, there will be no deterioration because of high temperature.

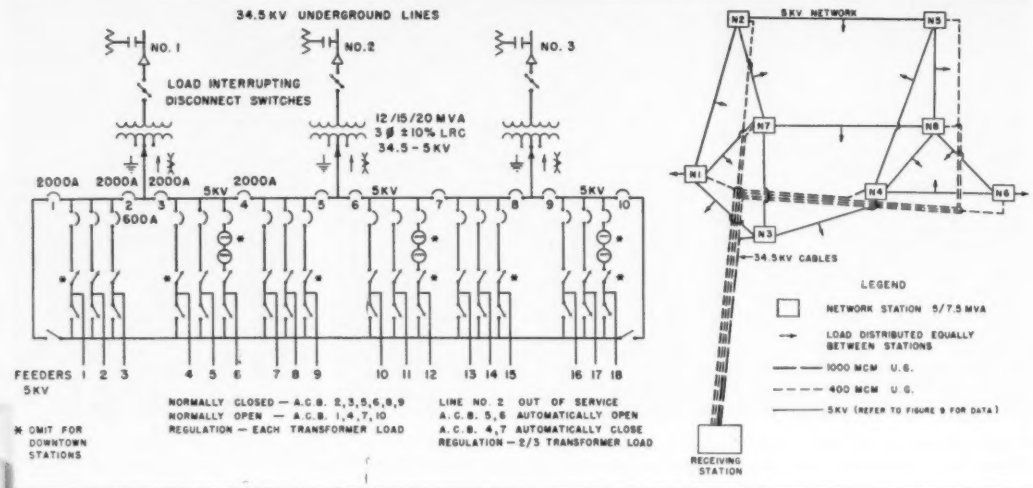
The bus conductor is round copper tube 7½ in. O.D. and is given a permanent black outer finish to improve the heat emissivity factor. On the outdoor portion of the bus the aluminum covers are not painted. Initially the emissivity factor will be lower than for a painted surface. However, the aluminum will eventually weather to a surface satisfactory for emissivity, and with the aluminum framing will blend well with the concrete dam structure. All of the insulator supporting rings are heat-treated cast-aluminum alloy. Thus, all the visible metal parts of the outdoor portion of the bus are unpainted aluminum.

A ground bus parallels all of the bus run and grounds the feet of each insulator ring to the station ground. Thus, any fault current flowing to one cover section through arc or through contact (a foreign object) is not required to flow through any other cover sections or any part of the supporting structure.

The method of conductor support adopted permits the use of full mill lengths of tube. This keeps the number of conductor joints to a minimum, which is important, especially in the long runs. Joints used are silver to silver and show a millivolt drop under full load at least as low as a comparable length of conductor. However, any joint represents a potential maintenance problem and the fewer the number of such problems, the better. Since an arc in any bus enclosure would generate ionized gases which could travel long distances, the air space within the cover is effectively sealed off at intervals by porcelain-metal baffles or barriers. These act to localize any trouble and also limit the movement of any arc along the conductor length. Without these barriers, an arc would tend to move without limit away from the source of energy.

The main connections are shown in a one-line diagram, where G represents the generator, M the motors, and ACB the airblast motor circuit breakers. The maximum value of short-circuit current (and maximum mechanical stress) is obtainable on the half load or 2,150-amp portions of the bus and not on the full load portion (4,300 amp). This follows from the fact that energy from the generator and one motor would combine in flowing into any fault located beyond the T where the bus splits. The maximum fault on the main run would be produced by the generator alone, or by the two motors.

This has an interesting application in the conductor design. Should the designer choose a tube suitable only for carrying 2,150 amp, he would be confronted with a lower section modulus, with which to resist the maximum forces. He must then support the weaker tube at more frequent intervals. The practical answer was to use the full-size tube for the full load portion, and drop to only a 5-in. tube for the remainder. This resulted in a simpler supporting structure, and a more symmetrical arrangement.



Primary network system (left) developed on network analyzer. Right: 34.5/5-kv radial distribution station with bus regulation

Will It Be Radial or Network Distribution ?

M. V. Eardley

Los Angeles Department of Water & Power

Following the period of war-imposed restrictions it was apparent to the Los Angeles Department of Water & Power that an extraordinarily large expansion program should be initiated. Such a program was necessary to regain the ground lost during the war and return to a safe margin between peak loading and distribution capacity. A decision had to be made between a continuance of the previously used 5-kv radial underground distribution system with individually regulated feeders or the adoption of some other pattern foreign to the past city standards. Any plan would have to be capable of absorbing all of the existing 2,300-v and 4,150-v acquired radial systems and the 550-v and 120/240-v d-c systems. The policy recently adopted to discontinue direct-current service in the city and to convert all a-c feeders to a common voltage, also was a factor to be taken into consideration.

Studies were made comparing the economic factors and operating characteristics of the following underground systems:

1. 120/208-v secondary network fed from 34.5-kv subtransmission.
2. 5-kv primary network fed from 34.5-kv subtransmission.
3. 5-kv radial distribution from 34.5-kv/5-kv stations with bus regulation.
4. 5-kv radial distribution with individual feeder regulation.

Three types of network installations were developed and studied:

1. A network to carry a 37,500-kva load concentrated in a downtown area of 0.112 sq miles with an ultimate load density of 335,000 kva per sq mile. The network was designed with three 34.5-kv feeders, each of three-conductor 750-MCM gas-filled lead-sheathed cables and 34.5-kv network transformers. This voltage was somewhat higher than the maximum of 27 kv now in use in the United States. For the secondary mains three 500,000 cir mil synthetic insulated cables in parallel per phase were chosen. All a-c and d-c loads in the area—except those now served from transformers on the customer's premises—were assumed to be converted to the network voltage.

2. A network to cover the area now served by the 240-v d-c system and to carry only the present converted d-c and 2,300-v a-c feeder loads.

3. A network that would afford complete coverage of the downtown area of 0.725 sq miles, with a network load density of approximately 52,000 kva per sq mile, so that all present loads on the 2,400-v feeders and the d-c systems and all future loads in the area up to the maximum of 37,500 kva could be placed on the networks.

Costs of each of these three networks were then compared with that of an equivalent radial system with a distribution station, with and without individual regulation.

With the favorable conditions of all relatively short and uniformly loaded feeders in the downtown area, a radial system was chosen for study. This consisted of three 34.5-kv radial subtransmission lines per station, each feeding one 3-phase transformer per line with no high-voltage bus or breakers, with one 5-kv main and one transfer bus with 3-section bus regulation and no provision for individual feeder regulation.

The cost of the station was predicated on the use of three 3-phase transformers, each rated at 12,000 kva self cooled, 15,000 kva with forced-draft cooling and 20,000 kva with forced-draft and forced-oil cooling, so that any two transformers could safely carry the peak of 40,000 kva, anticipated for an extreme winter. The station wiring is indicated in the accompanying one-line diagram.

Relative costs of the systems are as shown in the accompanying Table 1.

Considering the capital investment, a new distributing station with a radial feeder system offers the most economical method of system expansion. The cost is but 81% of that for the concentrated network area and 43% of that for the expanded network.

A secondary network introduced into a radial territory would have the disadvantages of two voltage standards and types of equipment for the department; two wiring systems for customers, and serious complications in the abnormal use of space in the public streets.

A second study was made of the possible application of primary networks to a combined business and residential area of 3.87 sq miles with an ultimate average density of 9,300 kva per sq mile and a present load density along a one-mile business strip of more than 27,000 kva per sq mile. Several primary networks were set up and studied on a network analyzer board. The normal load flow, voltage regulation, line loadings, required capacities and operating conditions were determined.

It was found that for a 37,500-kva primary network to function satisfactorily and cover the chosen area, eight unit-type stations would be required. Each would be rated at 5,000 kva self cooled and 7,500 kva with forced-draft cooling. Because of line outage conditions there may be as many as three network stations out of service simultaneously, leaving five units with an emergency rating of 7,500 kva each or a total of 37,500 kva.

To arrive at an economic comparison between the primary network system and a comparable radial system a determination was first made of the feasibility of bus regulation for a district of the type chosen for the primary network. The voltage study was based on the application of bus regulation to the feeders that now serve this area in part. It was determined that by use of 4/0 copper for the overhead portions of feeders, 500,000 cir mil cable for the underground take-off from station to pole and with three bus sections, satisfactory voltage could be obtained by bus regulation.

Relative costs of primary network and radial systems are as shown in Table 2.

It will be seen that both the capital and the present worth values favor the radial system. The costs in both instances were based on a 25-year period.

Conclusions reached were that in the areas under consideration—typical of conditions that prevail in the Los Angeles downtown and outlying spot business centers—there seems to be no justification for a change from radial to either a secondary or primary network system. However, considerable saving can be effected, wherever conditions permit, by the use of bus regulation and 34.5-kv radial subtransmission feed to stations.

A high degree of reliability is one of the advantages claimed for the secondary network. In the present Los Angeles radial distribution system this is accomplished by automatic transfer switches designed by the L. A. Department of Water & Power. Unlike the secondary network system, this requires no reserve transformer capacity for emergency conditions.

As was found to be the case with secondary networks, so with primary network distribution, the costs are substantially more than those for radial distribution with a major-type distributing system. If station maintenance costs were included in the comparison, the cost of network schemes would be further increased. Based upon the studies briefly summarized in the foregoing, the department has embarked upon a comprehensive expansion program. This will include at least three 40,000-kva stations with bus regulation. Two will have provisions for individual regulation on six of the 18 feeders to be installed in each of these stations.

Table I

Comparative Cost—Secondary Network vs. Radial Distribution

(Load, 40 MVA)

Method of Providing Capacity	Additional Capital Investment	Additional Investment per kva	Evaluated Transformer Losses—25-Year Period
Secondary Network System:			
1. Concentrated load area	$2,026,000	$ 54.00	$327,552
2. Large downtown area	3,788,600	101.00	
Station and Radial Distribution:			
3. New above-ground station	1,950,000	52.00	
4. New underground station	1,641,700	43.78	369,111
5. New above-ground station with individually regulated feeders	2,444,200	65.18	

Note: Station transformer loss factor, 0.25 cost of energy 6 mills for station, network transformers; 7.5 mills for 5-kv transformers.

Table II

Comparative Costs—Primary Network vs. Radial Distribution

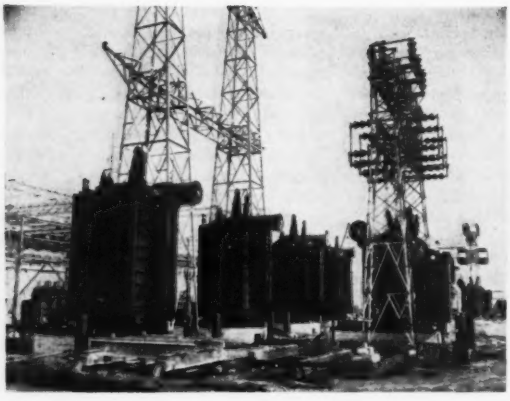
Total Present Worth for a 25-Year Period

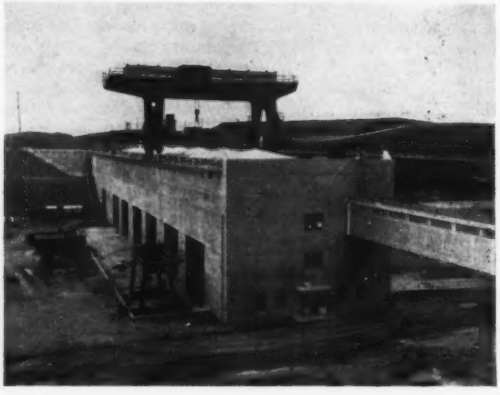
Year	Remarks	Primary Network System	Radial Distribution Bus Regulated Major Station
1950	Station, 34.5-kv lines and 5-kv feeders	$2,550,320	$1,647,000
1957	Station, 34.5-kv lines and 5-kv feeders	218,521	11,437
Annuity payments, energy losses less unused life		1,318,830	1,029,946
	Net present worth	$4,087,671*	$2,788,383

Capital Investment

Primary Network System—	Initial	Future	Total
34.5-kv Supply	$2,382,000	$227,000	$2,609,000
Radial Distribution Bus regulated major station, no 34.5-kv circuit breakers, radial 34.5-kv supply, 5-kv bus regulation	$1,647,000	$128,000	$1,775,000

*If 34.5-kv breakers and supervisory control are eliminated, the present net worth is reduced to $3,817,428.





Tracy Pumping Plant has Six 22,500-hp Motors

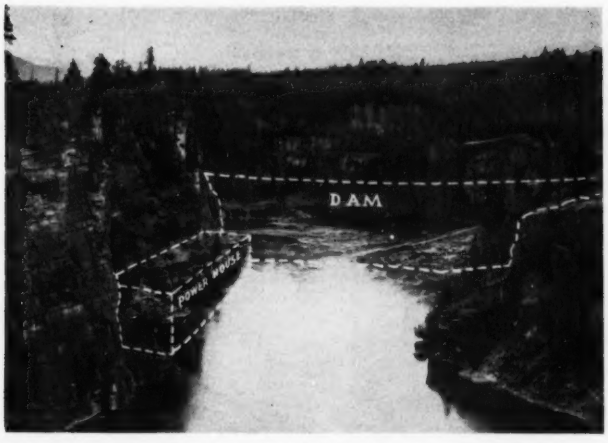
Tracy pumping plant, part of California's Central Valley Project, has six pumps each driven by a 22,500-hp motor lifting a total of 4,600 cfs of water. Sacramento River water is lifted 197 ft and discharged into the Delta-Mendota canal for ultimate consumption in the water-short San Joaquin Valley.

Power is supplied by the USBR, 230-kv Eastside line. Six 33,000-kva transformers step down to 13.2 kv for the pump motors. Pumping plant and transformers are shown.

New Hardpan Pole and Tower Footing Auger

Here illustrated is a new type pole auger designed especially for use in hardpan, decomposed rock and gravelly digging like that found in old river bottoms. Features of the auger are the special arrangement of teeth shown; a non-rigid fishtail pilot bit or double helix that will loosen and crowd aside rocks instead of becoming fouled on them; and hinged flaps on the trailing lips of the auger blades that hinge upward when the auger is boring and drop down to hold a load of dirt, sand, gravel or shale while the auger is being raised. With the special arrangement of teeth, the auger will bore a straight-sided hole from 10 in. to 36 in. in diameter, depending on model, without tearing down the sidewalls.

The auger is here shown mounted on a Pacific Gas and Electric Co. rig digging tower footing holes in the San Joaquin Valley near Tracy. The auger is known as the Pengo auger and is manufactured by the Petersen Engineering Co. of San Francisco.



Cabinet Gorge plant site where 200,000 kw will be developed in record speed of less than two years from filing of FPC application

Full Speed Ahead for Cabinet Gorge

Private utility will complete 200,000-kw hydro plant by October 1952 in time to relieve Northwest power shortage

The largest hydroelectric development in Idaho—a 200,000 kw project set to deliver power in 1952—is now under construction by the Washington Water Power Co. Located at Cabinet Gorge on the Clark Fork river in Bonner County, Idaho, the project will cost upwards of $40 million and will double the private firm's capacity in its Washington and Idaho territory.

The Cabinet Gorge development was initiated by WWP in direct response to the necessities occasioned by the critical power shortage in the Northwest. Under present construction schedules, the first of four 50,000-kw generators would be on the line in October next year, with the remaining three following at month intervals. This is a year ahead of major federal projects now underway in the Columbia watershed.

The site, as illustrated, is located a half mile west of the Idaho-Montana line, eight miles east of Clark Fork and a short distance from Pend Oreille lake. Morrison-Knudsen Co. Inc., of Boise, Idaho, internationally known construction firm, early in February was awarded the prime contract to build the dam and power plant. Ebasco Services Inc., New York, designer of the project, is in charge of construction under supervision of WWP officials. (Permission to build the plant had been granted WWP by the FPC in January, with the application held but two months, one of the quickest approvals on record.)

Cabinet Gorge Dam

The Cabinet Gorge Dam will be a reinforced-concrete arch-type structure rising 170 ft from the river bed, with a length of 500 ft. Thirty feet in width at top elevation and 50 ft at the bottom, the dam will impound 110 ft of water to elevation 2,175. The project will require the excavation of 500,000 cu yd of rock, and will call for 140,000 cu yd of concrete and more than 4,000 tons of reinforcing and structural steel to build the dam and power plant.

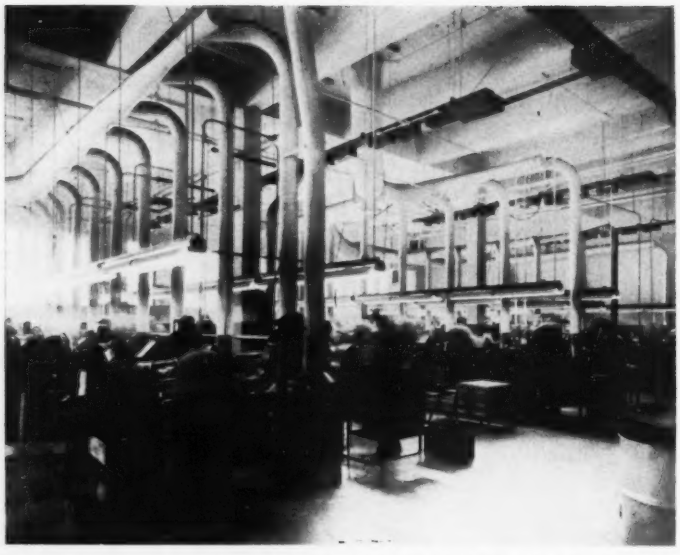
Reinforced concrete flood control works are to be located near the top of the dam consisting of eight vertical lift gates 40 ft wide and 35 ft high. Gates will be capable of passing a maximum flow of 230,000 cu ft per second. The reservoir will extend about 20 miles upstream into Sanders County, Montana, with a normal surface area estimated at 1,200 acres. (The Montana state legislature in January passed special legislation to permit the storage of water for use outside the state.)

The power house will be 400 ft downstream from the dam on the north bank of the river, as illustrated. It will be reinforced concrete substructure containing propellor - type turbines and supporting semioutdoor-type vertical generators. Four reinforced, concrete-lined penstock tunnels 27 ft in diameter and 450 ft long, driven through solid rock, will supply water to the 70,500-hp turbines. The generators will be 50,000-kw capacity, three phase, designed for operation at 60 cycles and 13,200 volts.

Diversion Tunnels

First important phase of construction for the contractor is the boring through solid rock of two diversion tunnels, which must be ready to divert river flow by July 15 of this year. Diversion tunnels will be 29 ft in diameter and 1,100 ft long. Two rockfill coffer dams will be built to permit unwatering of the river bed. Some 500 men will be at work on the project by late summer. Full crews will reach 1,500.

A 35-mile long 110-kv transmission line to supply construction power is being completed from a tie with the Bonneville Power Administration at Sandpoint by March 15. It is planned to build a 230-kv transmission line to transmit Cabinet Gorge power to WWP's Beacon substation in Spokane for interconnection with the company's system and the Northwest Power Pool.



Bus duct to serve motors in the Schlage Lock plant is typical of situations found in

Inspection of Industrials

Some of the problems an inspector must pass upon, as told at an IAEI Chapter meeting

B. J. Wiesinger

Electrical Inspector, San Francisco

Broadly speaking, the inspection of any electrical installation may be broken down to four or five major divisions, namely: adequate service, feeder and branch circuit capacity; proper overcurrent protection for conductors and for appliances; correct and workmanlike installation of the metallic raceway system and compliance with Safety Orders in regard to grounding, working space and safety requirements generally.

We are all familiar with the conventional service installation consisting of service entrance conductors, service switch and metering facilities in the range of up to 1,200 amp, 220 v, and 600 amp, 440 v, and will therefore pass up this type without further comment. The installation of high-voltage primaries to transformers located in a transformer vault within a building is a type of installation also quite familiar. In this latter case the transformers are usually the property of the serving company and metering is done on the secondary side of the transformer or transformer bank.

Large consumers of power, however, have found it to their benefit to take advantage of certain serving company rates, to buy primary current, to supply their own transformers and service equipment, the metering to be done on the primary with the customer absorbing the transformer losses. This is the type of installation we find at Schlage Lock Co.

Open Substations Instead of Vaults

In comparatively recent years a development in the improved design of high-voltage switchgear has resulted in the manufacture of fully metal-clad switchgear for primary voltages. Such metal-clad primary switches may consist of the removable truck gear type or may be of other approved design, complying with requirements for hook stick operated air gap disconnect switches, oil switches with overload trip coils, current and potential transformers for metering purposes. This type of primary equipment is designed for mounting in the open in convenient locations and is not required to be installed in fireproof rooms or transformer vaults. This is in accordance with Sections 2389 and 7135 of the NE Code.

A corollary development has been the Askarel-type transformer. Askarel is a coined word and from NEC definitions we find that it means a nonflammable insulating liquid that may be used as a coolant and insulator in transformers. Askarel transformers are also approved for mounting in the open, a transformer vault not being necessary for voltages under 15,000. (NEC Section 4522.)

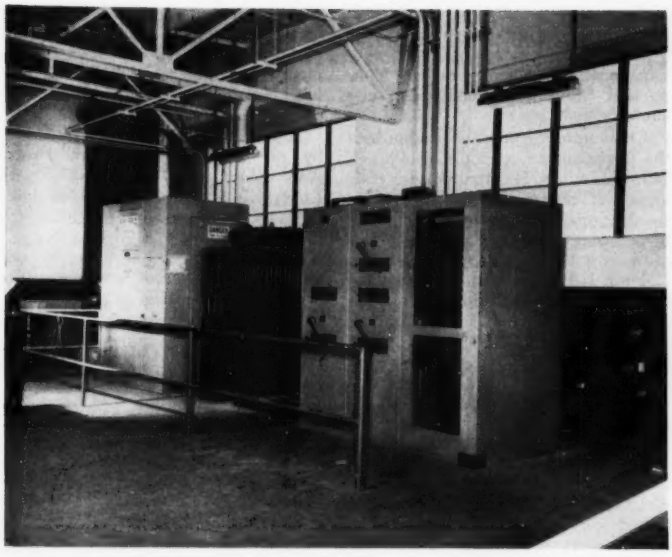
Schlage Lock Co. main service is a combination of metal-clad switchgear and Askarel transformer. Primary supply is from a pole riser to PG and E 12,000-v, 3-phase distribution and is led into the building in underground conduit that emerges from the floor slab within the primary switch metal enclosure. The transformer is 3-phase, 12,000-v primary to 480-v secondary and is of 1,500-kva capacity.

We have here a conflict with Electrical Safety Order No. 7-5001-a-4 which limits transformers not in a vault to a maximum of 5,000 v. I have, however, checked with the Division of Industrial Safety and have been assured that it is approving service installations such as have been described up to the 15,000-v limitation.

Secondary Load Centers

The 480-v secondary distribution switchboard is also metal clad, the bus bars being directly connected to the secondary terminals of the transformer and completely metal enclosed. Thus the entire assembly, from service switch to secondary distribution, presents nothing to the touch but substantial, thoroughly grounded metal surfaces.

The method of grounding may be of interest. The secondary distribution switchboard is set over a concrete walled pit where the underground conduits of feeder runs terminate. A copper bus bar grounding terminal is mounted on the pit wall. Four ground rods are driven. A No. 4/0 bare copper grounding conductor is lugged and bolted to the grounding bus, bonded to each grounding rod and to waterpipe nearby. Individual conduits in the pit and the conduits containing primary voltage conductors, the metal frame of the primary switch and transformer case are all bonded to the grounding bus. Ground connections on conduits are standard cast clamps and all lug connections are through pressure-type lugs. (NEC Sections 2613 to 2617.)



Instead of a transformer vault, the unit substation (left) with Askarel transformers is modern practice, and 480-v secondary distribution load centers with dry-type transformers (above) in compact metal-clad cabinets is a safe and neat job

On the 480-v distribution switchboard are mounted circuit breakers controlling various feeders. One 1,600-amp circuit breaker feeds plant No. 2 with three 500,000 cir mil RW conductors in parallel per phase leg and run underground in transit conduits. Another 1,600-amp circuit breaker feeds a subdistribution centrally located in plant No. 3 also with three 500,000 conductors per phase, run underground in transit conduits. Thermoplastic conductors larger than 4/0 are not approved by NEC or San Francisco Electrical Inspection Bureau.

Distribution with Bus Duct

A third large circuit breaker of 1,200-amp capacity feeds an installation of Trumbull bus duct known by the trade name, FlexiPower. This bus duct is of 1,000-amp capacity and is run into the polishing room where a large group of motors, somewhere between 75 and 100 in number, is installed in a compact area, a set up to which bus duct distribution is particularly well adapted. The bus duct is suspended from the ceiling at a height of 14 ft from the floor. Where the bus duct is tapped to supply branch circuits, overcurrent protection for the branch circuit is obtained by means of circuit breakers of the removable clamp-on type, secured to the bus duct. Contact to the main buses is made through removable plates which are spaced at regular 12-in. intervals along the main duct. These breakers may be opened or closed or reset from the floor by means of long hook sticks. Branch circuit wires in conduits provided with condulet fittings are carried on substantial racks in a neat and workmanlike manner to contactors with overload running protection mounted on each machine.

Rules for busway installations are covered by Article 364 of the NEC. Present-day requirements of State Safety Orders on busways, Order No. 7-511, are very brief and incomplete but I am assured by the state inspectors that busway systems installed in the manner outlined are acceptable.

Spray Room Well Designed

An interesting feature of the Schlage Lock plant is the spraying department, now located in Plant No. 2 but which will eventually be moved into Plant No. 3. The room in which spraying will be done is approximately 100x150 ft in size, and for efficiency in operation will be used not only for spraying purposes but also as an examination room. Two conventional-type spray booths equipped with the usual vent motor connected to vent ducts through the roof will be installed near one end of the room. Also two conveyor-type electrostatic spraying outfits will be used, one of which is now in use in Plant No. 2.

A short description of this outfit may be in order. A metal conveyor belt about 80 ft long and 1 in. wide, studded with rows of pegs on which door knobs to be sprayed are impaled, runs through a part metal, part glass enclosure in which the spraying is done on one end. Gas-heated air for drying purposes is blown in about midway and exhausted through ducts through the roof. The finished product is collected at the far end.

Ionized Spray with High Voltage

The actual process of spraying is done by using a transformer with 5 amp, 220-v primary and 130,000-v secondary to ionize the spray particles that are pumped in under pressure. One pole of the 130,000-v secondary is grounded to the framework thus grounding the metal conveyor belt; the other pole is connected to copper bars on insulators in the spray chamber. A considerable number of fine wires hang from these copper bars to help distribute this pole of the secondary through the spray vapor to ionize the spray particles and, by the law of attraction of opposite poles, cause the spray to deposit on the door knobs passing through. Incidentally, it may be remarked that all safety requirements of the Division of Industrial Safety in regard to isolation and guarding of the high-voltage transformer and secondary leads have been complied with and that electrostatic spray outfits properly installed will be accepted by the division.

Precipitated Air Filter

The spraying and inspection room before mentioned is supplied by a pressurized Precipitron ventilating system in which filtered air is blown into the room, the cubic feet per minute being far in excess of the spray booth

fans' capacity to exhaust. This makes it practically impossible to have any spray deposit accumulate anywhere in the room other than in the spray booths. *It limits the hazard to the immediate vicinity of the spray booths, and lighting anywhere else in the room may be installed in ordinary construction.*

Adequate lighting throughout the plant is very essential, because in lock manufacture many millions of small parts are processed and assembled. The minimum lighting requirements of the table for unit loads in industrial buildings, Section 2203 of NEC, have been far exceeded by an extensive installation of conventional fluorescent and slimline fixtures. All branch lighting circuit wiring is with No. 12 wire on 15-amp circuit breakers. No circuit is loaded in excess of 12 amp. Supply for lighting is obtained from local transformers connected delta-wye. One bank of three 25 kva transformers located near the main 480-v switchboard supplies the front section of the building. Another single unit, 200 kva, located at the subdistribution center in the manufacturing section, supplies not only lighting panels but also a considerable number of single-phase motors. Lighting panel feeders are in all cases protected by circuit breakers that have the same rating as the feeder conductors. Under San Francisco supplementary rules for loads in excess of 7½ kw, transformer capacity is determined by requiring it to be not less than 75% of the actual wattage, not the circuit, connected load. In other words, for each 100 kv of connected load, 75 kw of transformer capacity must be provided.

Motors Present the Problems

In any industrial plant the installation of wiring for motors presents numerous problems, too many and too varied to cover in a discourse of this kind. There are however six fundamental requirements to consider in the wiring for continuous-duty motors, namely: motor branch circuit overcurrent protection, the branch circuit conductors, the controller, the disconnecting means, motor overcurrent running protection and the characteristics of the motor.

All of these basic factors in motor wiring are covered in the NEC in minute detail. A detailed discussion here of the various rules of Section 430 would be merely a restatement of what is already in print, compiled by men who are specialists in their knowledge in this field and experts in code making. It would be presumptuous on my part to attempt to analyze or interpret these rules for it would be, after all, just my opinion of what some particular rule might mean. Your opinion could be different and you could be right.

I have found it helpful to approach the inspection of a motor installation in this manner: Has the motor a code letter? If not, then Table 27 applies to determine overcurrent protection in per cent of name-plate rating permitted for the type of motor listed in Column 1. It is obvious that, for some types of motors, a lower maximum value is assigned if circuit breakers are used instead of fuses. The same procedure applies if the motor has a code letter. With the motor ampere rating known, reference to Table 20 determines conductor size, overload running protection and circuit switch and fuse size. Location of circuit switch depends on circumstances and location of controller is largely a matter of choice and compliance with safety orders.

An Unsolved Conflict

There is one problem in the wiring for multiple-motored industrial machines to comply with NEC rules and State Safety Orders that has not been solved. That problem is correct short-circuit protection for the individual motors and controllers of such a machine. It is the practice of many, I might say nearly all, large builders of machinery, to design their electrical equipment with the preconceived idea and intent of having a single feeder run to multiple-motored machines and to depend on motor overcurrent running protection to protect the individual motors. NEC Section 670-Machine Tools is an attempt to meet the problem but the code evades the issue for other machines with the same characteristic that are not classified as metal-working machines. State Safety Orders do not recognize any such thing as a machine tool hook up, much less do they apply such rules to other machines. We want short-circuit protection on each motor, says the Safety Orders! There, fellow inspectors, you have the industrial inspector's worst headache. You say you can't pass the job and oh, brother, what a mess you have kicked up now.

The assembly may be a lot of contactors, relays, timers and other devices in a factory-built panel or an assembly crowded and enclosed in the base of a machine. There is no room to install fused switches or circuit breakers ahead of the contactors. The journeyman moans, the contractor weeps, the frustrated customer cries to high heaven. It is a heartrending scene. And, if the machine had been designed according to code requirements, so unnecessary. Compliance with Section 4330 would solve the whole problem.

Is this bastard hook up approved by the American Standards Assn.? And if not, why does the National Electrical Manufacturers Assn. condone its use where it is in direct violation of the NEC? Perhaps recommendation should be made by the chapters to have the Southwest Section call this situation to the attention of the IAEI.

In the wiring of cranes and hoists, Section 610 NEC, I have also found some cases where control panels that embody the same fault just mentioned are installed. Here again the manufacturer depends on overload running protection and not the circuit fuse to protect the motor against short circuit. As crane motors fall into the classification of Section 4312, that is duty-cycle operation, overcurrent protection should be provided as called for in Section 4323, which means the motor branch circuit overcurrent protection provided for in Tables 26 and 27.

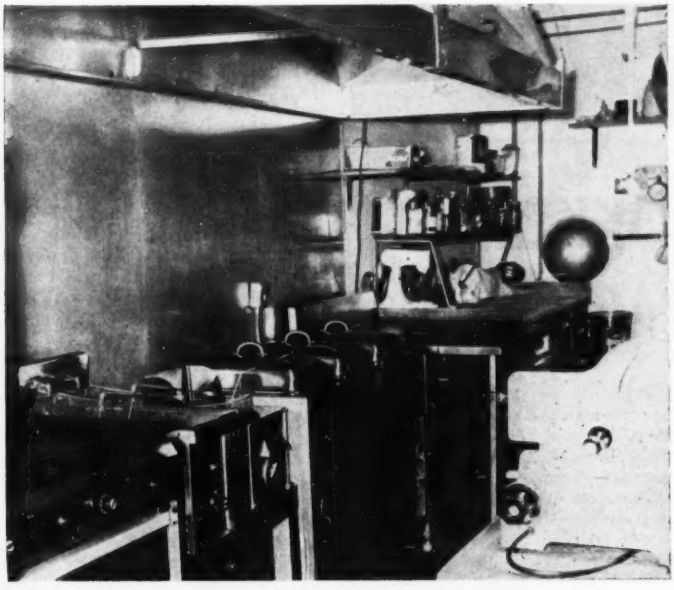
Electric welders used in industrial plants are covered in Section 630 of the code in a short, concise set of rules. Motor generator sets must be installed according to the general provisions of Section 430. Rules for transformer arc welders and resistance-type welder installations are liberal in the requirements for conductor sizes and overcurrent protection, as well as for group operation diversity factors. Adequate conductor size, particularly for resistance welders, is a prime necessity in order to minimize voltage drop, since such welders will not function properly at less than their rated voltage.

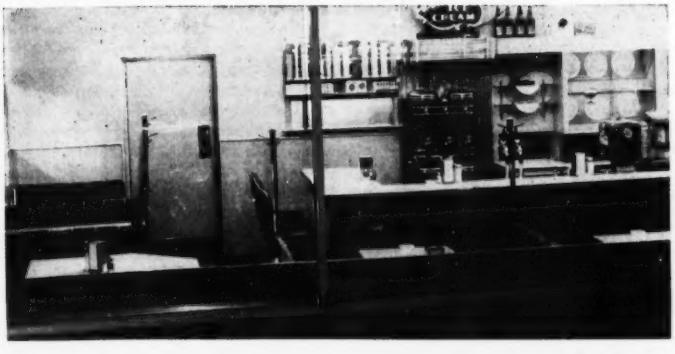
The infinite number of applications of electrical power to the wheels that drive our great industrial machine, the endless variety of apparatus necessary to process industries, the safe installation of the electrical machinery and equipment, the inspection of such industrial installations, without doubt make this field the most interesting to the electrical inspector. Perhaps it is a little more difficult but there are compensations. Contractors who install such jobs are usually men of ability and established reputation. The journeymen on the job have a little more of the know-how, a pride of craftsmanship in installing good-looking, safe jobs and a spirit of cooperation with the inspector. It remains then for the inspector to know his code and to enforce its provisions. The rules are there. Let the code decide.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 79

SUBJECT: All Electric Restaurant
CUSTOMER: Wayne Merrick, Abbotsford, B. C.
SERVICE COMPANY: B. C. Electric Co. Ltd.
PREPARED BY: H. Winter





This is a small restaurant capable of seating 35 customers for full course meals or snack bar service. Being located in the new Canadian Legion building, it also caters to banquets and dinner meetings. When this restaurant was built about two years ago, it was the original intention to install bottled gas equipment but after due consideration, complete electric equipment was installed in spite of the greater cost of installation.

Results

This decision has resulted in a cleaner, safer and cheaper operation through the controlled-heat electric equipment. Another important factor is coolness in the elongated kitchen (10x25 ft). The entire cooking load is supplied by a 220-v, 3-phase service. Wayne Merrick, owner and operator states: "I have never regretted my decision to install electric cooking equipment in my kitchen and I am more than satisfied with the efficiency and economy of operation this type of cooking is giving me."

Production Data:

Meals per 18-hr. day 409, peak day
Meals per 24-hr. day 520, peak day
Meals per month 11,700, peak month
Hours of operation 7 am to 1 am
Days operating per month 30

Electrical Data:

(Cooking Load Connected:)

Range	16.5 kw
Grill	7.5 kw
Fryer	4.5 kw
Fryer	3 kw
Toaster	2.5 kw
Urns	3 kw
*Water Heater (Capacity 50 U.S. gal.)	4 kw
Steam Table	2 kw
Total	43.0 kw

*Storage tank heated by two 2-kw water heaters, one one-third down with thermostat set at 180 F, and one near bottom set at 160 F.

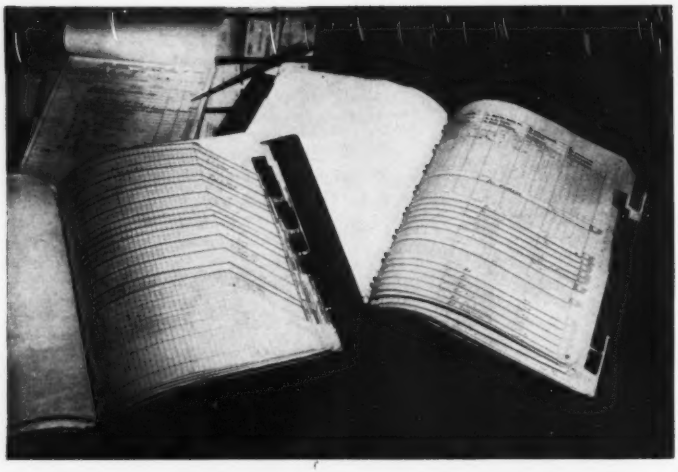
Mechanical Load

Refrigerator, potato peeler, meat grinder, 1 hp total.

Operating Data:

(Cooking and Water Heating only)

Average kwh per month	3,300
Water heating only	720
Rate 1½c per kwh	
Average cost per month	$50.00
Average kwh per meal	0.282
Average cost of cooking and water heating per meal	0.42



Two of the forms Heumphreus developed, one for keeping record of materials purchased and pricing information; the other as individual ledger sheet for accounts receivable. Both are punched with a number of holes to be placed wherever desired in loose-leaf binders, alphabetically indexed. They and the material and labor takeoff and billing form are shown in photograph

ONE-MAN BOOKKEEPING FOR A CONTRACTOR

When a contractor runs a small business he often must be his own bookkeeper in addition to doing the estimating, buying, hiring of men, supervision of his jobs and collecting for them. The simpler he can make it for himself the better. Yet he needs and must keep records, both for his own protection from loss and to satisfy the tax collectors.

Don Heumphreus, one of Santa Barbara's pioneer electrical contractors, found himself in that spot at one time and so developed a much simplified accounting system which has served him effectively ever since, even with a substantial growth in his business. He even interested the Charles R. Hadley Co. in printing the simplified forms he developed and making them available to any contractor who wants to use them.

The elements of the simple system are: Pricing sheet in duplicate, bound in a numbered pad; individual customer loose-leaf journal form; credit sheet in duplicate bound in numbered pad; invoice to customer; counter machine with order forms in triplicate; three-drawer file; stock and purchase record form (VR121) for loose-leaf binder.

Pricing sheet—This is made up in duplicate, the original being perforated for removal and attaching to the invoice to the customer. It is printed with the company name, address, etc., and has lines for customer name, address, and date. Columns for quantity, description of the items, and charges are provided. Totals and serial number from this book are entered on the individual customer ledger sheet. When the book is used up, it is marked on the cover with its serial numbers and is filed for future reference in the bottom file drawer.

Heumphreus has found that customers understand labor cost better when he enters on the pricing sheet each day's labor, rather than lumping all labor in one item at the end of the page. On this sheet are also entered sales tax that is applicable, inspection fees, overhead costs, any special costs. No separate or other record has been found necessary for these items. It is all on the duplicate yellow sheet for tax accountants or anyone to check. This in itself saves much bookkeeping.

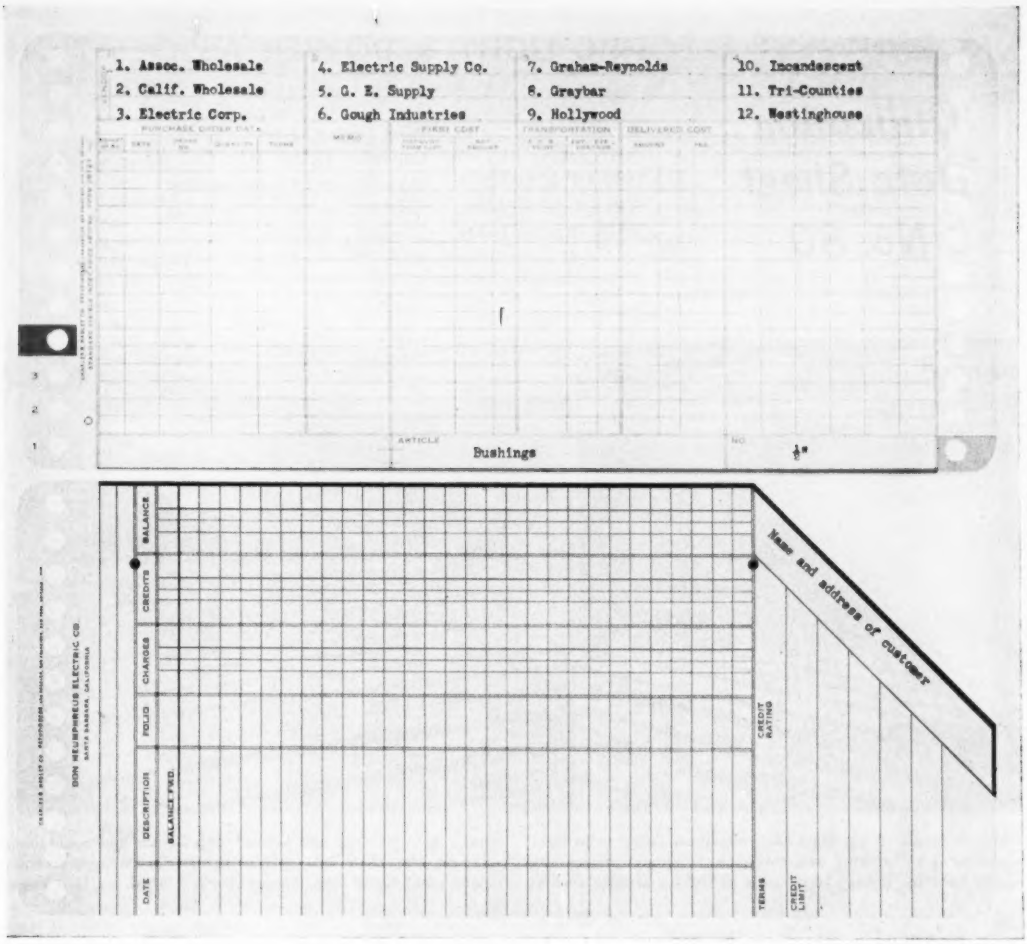
Customer ledger sheet—This form is ingenious. (See illustration.) Made for loose-leaf binder, the customer's name and address is typed along the slanting edge. Terms and credit rating and limits are noted alongside. The date, balance from the pricing sheet, pricing sheet number, are in three columns and then charges, credits and balance columns are used to enter payments. Because these customer sheets are placed in the binder below each other, only the customer name and the balance column is exposed on opening to the alphabetically tabbed section. This ledger gives instant information as to every account and lists by number where the complete itemization can be referred to.

Credit book—A book similar to the pricing book, also in duplicate, is used to enter material brought back from the job or turned in by the customer for which credit is given on the account. The original goes to the customer with the invoice, the duplicate is kept in the book, the book is filed. Each page is numbered and this number entered with the credit on the customer's ledger sheet.

Invoice — A typical invoice form, familiar to all, is used. It carries the company name, etc. Instead of listing the items, however, Heumphreus lists only the number of the pricing sheet or credit sheet accompanying the invoice, and the total to be paid. Follow-up bills do the same.

Counter order machine—To write up sales from the counter, either in appliances, fixtures or wiring materials, an ordinary triplicating counter order machine is used. The customer gets the original. The duplicate goes with the monthly statement and the triplicate is filed in a loose-leaf binder after being transferred to the ledger sheet for the customer.

Purchase record—To keep a record of purchases and also to make this information usable immediately in estimating jobs, Heumphreus simplified things also. He developed a stock and purchase record which Hadley calls "standard visible index price record (form VR121)." It too is made to fit into a loose-leaf binder. At the top are spaces for listing the names of suppliers from whom purchases are made, each numbered. The columns below provide for space to list the number of the supplier from whom each quantity is bought, date, order number, quantity and terms. A space for some memo regarding the order comes next, with columns for first cost, broken down into discount from



list and net amount. Transportation charges have two columns. Then there are two columns to put delivered cost in amount and per unit. Other blank columns are used for breakdown for sale in smaller quantities. At the bottom is space to print the kind of article and its size. For example there is a sheet for each kind of material in each size, such as "bushings, ½-in."

Orders sent to the supply houses and invoices from them are kept in one set of folders in the file cabinet. To key them the tab has red stripes on it for those from out of town, such as the Los Angeles supply houses. Green stripes on folders are for accounts locally. The folders are indexed alphabetically. A second and duplicating set of folders in the rear of the drawer is used to transfer the bill when it is paid. Before thus filing, the quantities and prices are written on the purchase record sheets. Paid bills are notated with the date of payment and the check number. Only other form then is the checkbook and its stubs.

Estimating tables—On Don Heumphreus' desk, where he does his estimating and billing, he keeps a group of tables of prices on commonly used items. These he compiles from the Biddle Trade Bureau pricing service. For odd items he refers to the Biddle book.

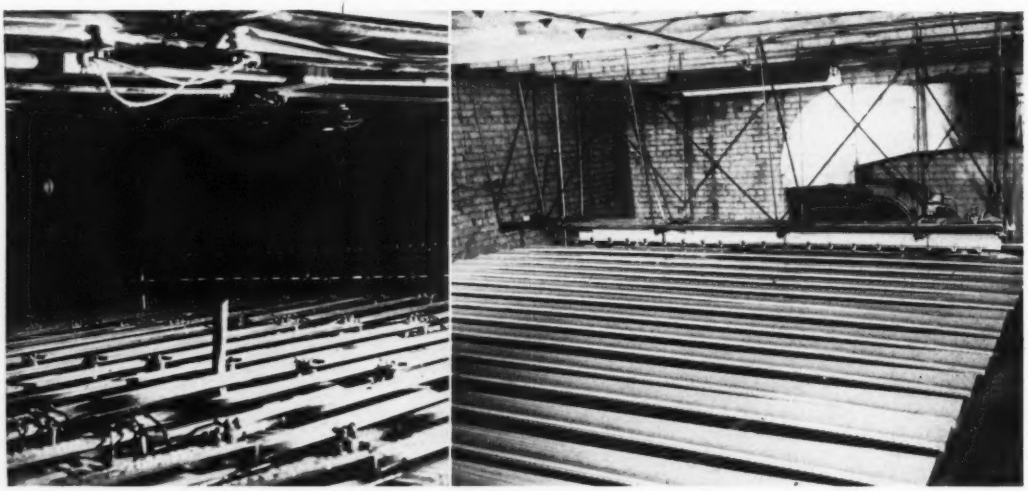
On these tables he carries out to several decimal places the price per item, because he has found that there will be differences of from 50c to $2 on a full list of items, and, by saving these small amounts, he feels he is making a saving at the end of the month well worth while. No use ignoring the decimals. These have paid for the Friden Calculator and the adding machine that Heumphreus uses. He feels that they are no extravagance to the man who has no help. They are his help. With numerous price changes to compute and percentages to work out, and all the mathematics that are needed, these are a good investment.

An interesting thing is that Heumphreus uses both calculator and adding machine together, the one to calculate, the other to keep a tape record of the figures so that, if he is interrupted by the phone or a visitor, he can pick up quickly where he left off. The machines are useful in calculating sales taxes and in many other ways. Machines and a simple system make it possible for a contractor with a small business to keep up with the book work that is such a headache to most men in such a business.

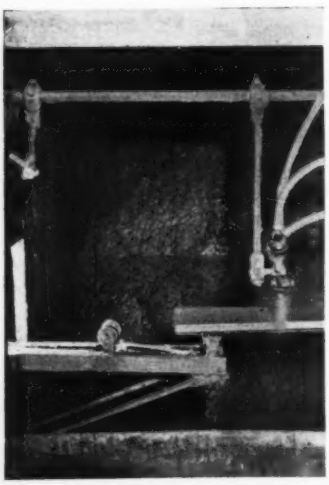
NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 80

SUBJECT: Paint Drying Oven
CUSTOMER: Columbia Electric Mfg. Co., Spokane, Wash.
TYPE OF BUSINESS: Manufacture of metal products
SERVICE COMPANY: Washington Water Power Co.
DATA PREPARED BY: Edwin M. Atwood



Conveyor system at left takes 16-ft aluminum siding strips from automatic paint sprayer and covers them through electrically heated oven for drying. Inside view of 315-kw electric oven is shown at right. Top and bottom strip heaters and connections may be seen. There is a space of 18 in. between conveyor (not shown) and top of oven. Energy cost is $.00324 per 16-ft siding



Spray booth uses electrically heated paint

In the plant of the Columbia Electric Mfg. Co. of Spokane a 315-kw electric oven is being used successfully for drying the paint on pieces of 16-ft aluminum siding used in building construction. After the product is automatically sprayed with an acromatic heavy petroleum solvent, it then passes through a conveyor-type electric oven. Connected load is 315 kw, 240 v, 3-phase. Operating temperature is 350° F. Paint is heated to 180° by 15 kw of electric heat.

Oven Described

The oven is 18 ft wide, 56 ft long and 18 in. between top of oven and conveyor. Top and sides are insulated with 2½ in. of insulating brick. Reflecting metal sheets are placed beneath the bottom heaters and behind the strip heaters on the top. Air is circulated through the oven at the rate of 10,000 cfm.

Safety Factor

The aluminum siding passes through the oven at the rate of 10,340, 16 ft pieces, or 51,700 lb in a period of 16 hours. Temperature control was important to this process in order to bake the paint properly. Since the vapors are explosive, electric heating of the oven was safer. Operating data will be found in the accompanying table.

Operating Data

Connected load	315 kw.
Demand 240 v, 3 phase	315 kw.
Operating temp. of oven	350° F.
Temperature of paint	180° F.
Paint used	10 gal. per hr.
Production per 16 hr.	51,700 lb.
Kwh used per month	75,000
Energy cost	$670
Kwh cost per piece of 16-ft. siding	$.00324

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

New Safety Orders

California's revised 1951 Electrical Safety Orders become effective March 28, after four years of revision meetings. They differ from the old in arrangement of articles and in some new ones. In general the National Electrical Code has been followed but in different order and in some condensed wording or grouping of sections. The one major divergence is in staying with the old wire table instead of that in the code. Ironically the utility group which plugs hardest for the NECode supported that throwback. Sam Rosch would call it, "politics instead of physics."

Leader lost

Ed Vanderlinde, popular president of National Electrical Contractors Assn., died, March 24, while returning from a vacation. He was elected at Houston in 1949; presided at the Los Angeles convention last year. He had been in business at Rochester, N.Y., since 1921. The NECA administrative committee will have to appoint a successor until October's convention in Washington, D.C.

Change of policy

NLRB has decided that it will require elections for union shop and union representation in the building trades, which former counsel Denham declared were impractical. With men working a few days for a shop, then for another, it could be plenty confusing, but evidently NLRB plans to poll the electricians, for example, to decide for an association of contractors. Continuing agreement closed shops may be ruled out though.

Which is it?

Travel time or travel expense is an issue that is far from settled. Complexity comes where wage and hour law is brought in, for if it is pay for travel time, then overtime rates often are involved; so are taxes, social security, etc. A case in a steel erecting contract in California went back three years to make a contractor pay extra time. San Francisco Electrical Contractors are entering a friendly suit to determine where they stand.

Advanced dates

District 8 meeting dates have been changed. This NECA district, comprising Colorado, Wyoming, Utah, Idaho and Montana, originally set May 4-5, in Billings, as its annual meeting dates. Now the dates are June 22-23.

Channels challenged

Department of Justice indicted the Minneapolis, St. Paul electrical contractors associations and Midwest Electrical Council and suppliers, Locals 292 and 110 IBEW and individuals, charging restraint of distribution by making no installation of electrical equipment unless sold by the manufacturer to jobber to electrical contractor to general contractor to the public. Claimed public was deprived of savings buying direct.

Take over Union

Gene Heiss, IBEW international representative, was told by O. G. Harback, IBEW vice-president, to take over temporary running of Seattle's Local 46, following resignations of its president Glenn Charles, board chairman R. E. Smoot, and others, and business manager E. Scheib. Trouble probably was over Seattle City Light takeover of PSP&L.

Thrown to committee

Salt Lake City's new electrical code has been put into the hands of a committee representing 15 organizations, at the request of Mayor Glade and the city commission, after original drafts by the city inspector and by NECA and others were in conflict. First hearing on a new draft was to be held April 9. Former ordinance was passed in 1934, amended 1944.

More dates

Dates Ahead—National Industrial Service Assn. meets in annual convention at Plaza Hotel, San Antonio, Texas, April 15-18. Among its speakers is William Hogue, Larsen-Hogue Electric, Los Angeles, on "Where is Your Break-Even Point?" . . . Los Angeles Home Show will be at the Pan-Pacific Auditorium, June 14-24. . . . IRE Western convention and 7th annual Pacific Electronic Exhibit will be at San Francisco civic auditorium, Aug. 22-24.

Colorful personality

Rudy Staud, president of Benjamin Electric Mfg. Co., former IES president and one of the founders of RLM and Fleur-O-Lier standards organizations, died March 28.

Seeks facts

Robert Maxwell, San Jose city electrical inspector, asks other inspectors to send him information of cases where abuses of the new clip-on or stab-in or add-on circuit breaker panels are found. That is, where, after once installed, someone substitutes a breaker of larger rating for the one originally circuited for. Wants facts, not just suspicions, he says. Manufacturers claim the practice unlikely; inspectors fear it may become prevalent. So facts of any actual cases are needed.

Rainbow

Duro-Test Corp. claims to have exclusive rights to a new "mystery-x" fluorescent lamp invented by Italy's scientist, Paolo Sereno, which can present a variety of colors at the same time.

Useful tool

"Getting the most from your home's electric system" is the title of an exceptionally fine 24-page booklet just issued by the National Adequate Wiring Bureau, designed to be given to prospects for wiring. It contains among other features a room-by-room check list of lighting and appliance uses for which wiring should be installed. Available in quantities from the bureau, 155 E. 44th St., New York.

New heaters

Westinghouse has a new line of wall-mounted electric home heating units in nine wattages, from 1 to 6 kw, in four widths and all operating on 230 or 240 volt circuits. Made at the Sunnyvale plant.

Handy

Especially useful is the directory put out by the Refrigeration and Air Conditioning contractors Assn. It lists its members' names and addresses and the services they perform, what they sell and install, and the products they carry. Cross indexes list manufacturers' trade names and which members handle the line, services done by members, etc.

Designed for you

The directory that comes with this issue of Electrical West is something to be kept, too, for reference throughout the year. It lists the manufacturers of electrical materials and equipment and who represents them in the West. This year addresses of the representatives are listed with the manufacturer's name, aiding in quick finding in the locality nearest you. Then there is a Where to Buy list by products, which refers you to manufacturers of these products. For those doing appliance repairs there is an up-to-date directory of authorized service stations and factory parts distributors for all appliances. This is a service feature of Electrical West available nowhere else and worth more than the yearly subscription price. Keep it handy for everyday use.

In the future

A new electric radiant heating panel is being developed by General Electric Co., according to a speech given recently by Clarence Frere, engineer in the automatic electric blanket division. It results from the study of body heat made by that division. The panel under test is a wafer-like panel, 30 mils thick, with a copper alloy element sandwiched in phenolic laminate, grounded with an aluminum sheet and equipped with a termination block and base section of a raceway. It would be affixed to walls or ceiling with a thermosetting adhesive resin. Panels could then be painted or papered over. Advantages would be quick response and no heat storage to overshoot the heating need. Sensitive controls are also being developed to lessen the demand and improve load factor.

Island program

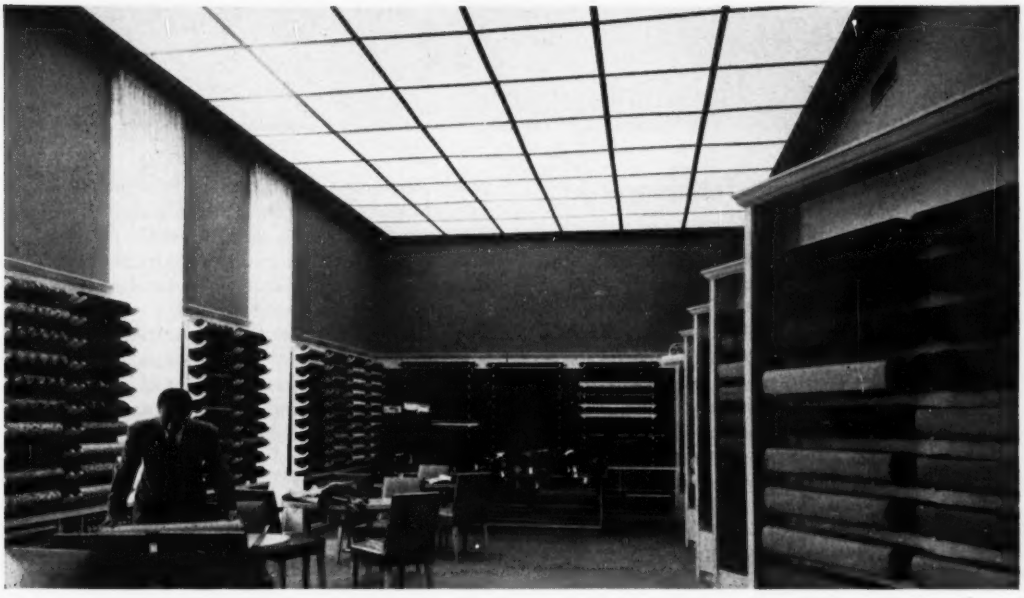
Electric Service League of B.C. plans to launch an aggressive electrical wiring campaign in the Victoria district, providing the materials are available, in the fall, according to S. E. Jarvis, manager of the league's Victoria district.

Light for all homes

Contemporary Lighting in Modern and Traditional Interiors is a new report just released by Illuminating Engineering Society. It combines adequate home lighting with good interior decoration techniques, written in layman's language. Well illustrated, the 64-page book is a fine guide for home builders, contractors, designers, homemakers, utility personnel and others. Sold for $1 by IES, 51 Madison Ave., New York.

Plug a leak

Committee on Hospital Operating Rooms of NFPA is asking for nominations to a technical subcommittee to advise on a proposal to standardize electrical receptacles for installation in anesthetizing locations in hospitals. Lack of interchangeability results in makeshifts and unsafe practices. Standardization, it is felt, would contribute to greater safety.



Luminous Ceiling New in Lighting

Newest development in lighting on the West Coast is the luminous ceiling. One of the earliest, if not the first, installation of a plastic luminous ceiling in the West is that at Saks Fifth Avenue fabric shop in Beverly Hills. This installation, here illustrated, consists of a Marlux plastic ceiling made by Martin Electric Products Inc.

The room is roughly 40x20 ft, with a 14-ft ceiling. Average intensity of over 40 f-c (maintained) is achieved with five rows of 200-ma warmtone slimline lamps on 4-ft centers. The lamps are mounted 3 ft above the plastic. It is possible to space lamps one and one-half times the distance above the ceiling and maintain uniform ceiling illumination.

The plastic material is a non-combustible vynl corrugated sheeting developed jointly by Professors Moon and Spencer (MIT and Brown University). It has a transmission of 51%, but because of interreflections in the enclosed ceiling chamber, the efficiency is better than 75%. Coefficients of utilization better than 90% are obtainable, and light on vertical surfaces is nearly the same as on horizontal surfaces. The over-all effect is soft and pleasing.

Maintenance is said to be simple with a two-year cleaning period sufficing. Since the Saks installation was made there are now available translucent plastic rails, with no cross pieces, on which the material slides, similar to a roll top desk.

Designing architect was Burke, Kober & Nicolais; the electrical contractor, Keith Electric Co., both of Los Angeles.

An Idea—to Use Yourself; —To Sell to Others

For nighttime window shoppers, Baron's in Beverly Hills, a large shade and lamp store, makes it possible to light up groups of lamps or fixtures inside by having had installed at the door jamb a small lighted panel and four push buttons. The panel says: "Push these buttons to our interior lighted displays."

Such installations can be made with any of the low-voltage relay systems, the push buttons operating on low voltage to actuate relays switching on and off groups of lamps. It is an idea that can be sold to many stores.

ELECTRICAL WEST

Frank Hansen, Torchbearer

AMONG the many who march toward a goal sometimes there emerges one whose devotion to an ideal causes him to forge ahead. He explores the way and beckons to his followers to speed along the path he has found. In lighting, here in the West, there have been two outstanding men of such dedication, both of whom now have gone on ahead to explore beyond earthly light and shadow — Clark Baker, and now, Frank Hansen. Both could be termed torchbearers of lighting education, carrying a message of seeing to the public.

Frank Hansen, with Danish ruggedness and directness, had to leave commercial enterprise because of health, but his penetrating mind would not be satisfied by inaction. So he turned it to producing simple, clear, human and understandable booklets to be used to teach the fundamentals of good seeing and good lighting to the new generations. He founded and directed the Western Institute of Light and Vision as an educational, non-commercial vehicle to publish and disseminate such information, and the utility companies of the entire nation, seeking material from some such unbiased and non-commercial sort, distributed and are still distributing these pamphlets to schools and to the public.

Thus his needed and fundamental good work carries on after him.

Time to Liquidate

IT is time now for the SEC to clean up the unsavory mess cooked up by Howard Aller, president of American Power & Light Co., in his attempt to dispose of the common stock of the Washington Water Power. Now that the Washington court has granted a permanent injunction against the sale of the WWP stock to the Stevens, Chelan and Pend Oreille PUDs, there is no reason for further delay in liquidating American. At the time American sold the Pacific Power & Light common stock, we called it a "useless holding company" since its one remaining utility subsidiary was WWP. For all practical purposes American was then but one step removed from dissolution, we said at that time. The court's decision simply tends to emphasize that fact. One group of stockholders did petition the SEC last fall requesting that American's assets be distributed.

Further delay would only make more ridiculous the travesty whereby one segment of American free enterprise sells another into the slavery of government ownership for the sake of selfishness. Such an act is even more treasonable to the principles of free enterprise when it ignores both the desires and the interests of the public. U. S. Senator Dworshak of Idaho, appearing before the SEC, characterized the deal in this language: " . . . I was shocked to observe the completely ruthless disregard for the interests of the public and the consumers, displayed by counsel who referred frequently to the interests of stockholders of American Power & Light. It is a sad commentary upon the ethics or lack of ethics of privately owned utilities which, in an instance like this, profess to be concerned primarily, if not solely, with what is best for the stockholders of a holding company."

The SEC will perform a service to the public and to the principles of sound utility service if it will now order American Power & Light to distribute its assets and to liquidate itself.

Whiffletree or Harness

"ESSENTIAL to the defense power program" . . . that's the justification of the federal power planners for the Oregon-California intertie. "Maybe," say the engineers who have long discussed the merits of such an interconnection. Their considered conclusion has been that such a line would be technically feasible, but about as practical as hitching a pair of Percherons to a wagon with a glass whiffletree. But the federal people, under the all-enveloping cloak of the "defense power program," want to buy the glass whiffletree anyway, even though it may, in the long run, turn out to be a boomerang instead.

They hope that it will let the already

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over-burdened Percheron from the Northwest shift to his more provident privately-owned half brother from the south, a small —a very small— part of the load of half-fare and free riders who have already filled all of the seats on the wagon and left none for even those who are willing to purchase a full-fare ticket. In return for this help they offer to let the southern brother share in some rich summer pasture which at the moment is going to waste, forgetting that in a few years there will be so many northern horses in the field that there won't be enough feed to go around.

In more conventional terms we might echo the words of F. Ford Northrup, president of the Northwest Public Power Assn., in a letter to Secretary of the Interior Chapman: "In considering the possibility of sending 200 to 400 million kwh over a six-month low-water period to the Northwest from California, I am reminded, for comparison, that our small electric system of Eugene, Ore., sold in 1950 to its general retail customers the total of 203 million kwh."

Glass whiffletree indeed. Or could this be another ill-disguised piece of the complete harness (including bit, blinders and 3,000-mile long reins) being fashioned by the federal power planners to tie the tremendous horsepower of the entire Pacific Coast to their half-fare merry-go-round?

You Can Say That Again

Why Not a PPD?

This PUD-WWP affair encourages the editor to reveal, at last, his long-cherished and spectacular plan for the formation of a state-wide PPD, with headquarters in Whitman county . . . PPD? Haven't you guessed? . . . That's right, it stands for Public Pea District, and would furnish us with the means of forcing—, er we mean, passing on the benefits — of the Palouse country dry pea to the public . . . Private enterprise has failed miserably in putting split pea soup on every housewife's table — it has failed to bring cheap split pea soup to the home of the lumberjack, the undertaker, the haberdasher, the raconteur, the connoisseur, etc. It's failed to fully develop the pea resources of the Palouse country. It's high time the people took over, since peas belong to the people! . . . We can start by forming a Whitman County PPD to provide cheap peas for every home and we know that the southern part of Spokane County and Latah County, Idaho, will immediately form their own PPDs . . . Then just as soon as the legislature passes a law, and the governor signs it (on promise that we won't take over more than one private pea company) we can begin dickering with American Pea and Legume Co., a holding company, to buy their common stock in the Washington Withered Pea Co., and take over the pea business in all of western Washington. Of course, we can pay them twice what it's worth and slip a little commission to P. Markuter, the broker . . . Once the deal is put through, the Whitman County PPD will have the rest of the state where it wants them — we'll furnish 'em peas and pea soup until it runs out of their ears — we'll teach the public the great benefits of pea-eating and pass on the savings of a PPD to them. We'll even agree to pay some "in lieu" of taxes to make up for the taxes the private pea companies will no longer be paying . . . Long live the PPD! (Even sounds better than PU-D, doesn't it!)—Colfax (Wash.) Gazette-Commoner.

More than 35,000 garbage disposers installed in garbage-free communities: Norwalk, Lakewood Park, Whittier, North Long Beach

Model homes in Lakewood Park have signs advertising it as a garbage-free community of 17,500 homes; Pulverator equipped

A Plan to Sell Garbage-Free Cities

but one in which all dealers, distributors, manufacturers can participate in free competitive enterprise

If city-wide installation of garbage disposers is desirable—and it is—how then can it be done in a way that will be fair to all makes of disposers, to the dealers and wholesalers who sell them and to the public? Suggestions sometimes are offered that a deal be made by one make for wholesale installation for the entire city. But this, obviously, is unfair to all the others and becomes monopoly, not the free enterprise system.

Reports that some such program was being suggested for Los Angeles brought a strong declaration of principle in distribution by Given Mfg. Co., makers of Waste King Pulverator, which news reports had declared had been in consultation with Los Angeles city officials. Bertram Given, executive vice-president, asked that his position be made clear.

"We do not favor any plan for selling and installing garbage disposers to cities that tends to bypass the wholesaler, dealer and installer. We believe in fair competition and free enterprise. What we advocate is a community-wide garbage disposer plan that eliminates cut-rate prices or special packaged deals but gives every manufacturer, wholesaler, dealer and installer a chance to compete openly and fairly, offering their products and services to the public, allowing them to select the brand and service that meet with their individual preferences."

What then is the plan?

First must come steps to get acceptance. Public officials who wish to eliminate a serious problem of garbage pickup and disposal, must initiate the program. Technical data are needed. A civic coordinating committee made up of interested groups should be formed. Changes in some ordinances are necessary. City budgets need adjustment to add needed sewage disposal facilities. Only sewage treatment and disposal works, usually, are involved. Costs are balanced by savings from eliminating collections and by sales of digested sewage sludge as fertilizer.

After such preliminaries, subcommittees are needed to take on various phases of the program and coordinate them. They would call upon manufacturers for information and for coordination of suppliers of the waste disposers into the program. Cooperation should be obtained from master plumbers and electrical contractor associations, building contractors and architectural groups, appliance dealer associations, wholesalers, water and power utilities and other business groups. These can assist in drafting new ordinances, codes and the administrative procedure. They can also set up standards of performance as guides and to protect the public from inferior merchandise.

Representatives from banks and lending institutions can formulate simple financing procedures for installation and sale. Government agencies with loan guarantee sections should cooperate in this phase.

Service groups and women's organizations may be invited to join in the plan and be assigned to study public health and beautification aspects to expand upon the data compiled by public health officials.

After these preliminaries the entire program must be presented to the city residents at civic gatherings and through newspaper, radio and television publicity. Discussion and debate should be encouraged to arouse interest and allow full understanding.

"By permitting individual householders to choose the garbage disposer they desire, by permitting them to choose the plumber and electrician to install it, and to choose the method of financing they prefer, the business thus created," says Given, "is distributed throughout the community. According to our figures over 70% of all money stays and recirculates in the community. It is essential, therefore, from this standpoint that in drawing up ordinances and putting the community-wide plan in operation that public officials recognize the inherent stability and reasonableness of this element of individual selection.

"Furthermore such a plan will relieve the city of the grievous and burdensome liability of financing and selecting garbage disposers. The disposer properly becomes the property of the landowner."

They're Promoting Sales

Rocky Mountain Electrical League—Holding its annual spring conference at the Shirley-Savoy, Denver, at which sales and promotion and adequate wiring committees will make plans to aid sales for the year, April 16-17.

Intermountain Electrical Assn.—Carrying Utah Power & Light Co.'s sales program, "Unite for Success, Make '51 the Best," to dealer and contractor meetings in all chapters where that utility serves, R. H. Ashworth, vice-president, W. A. Huckins, sales manager, Marlow Cummings, advertising manager, Evelyn Hansen, home service director, and J. F. McAllister, residential and farm sales director, Glen B. Walker, industrial sales director, and Homer Shaw, commercial director, presented the program at dinners in Salt Lake City, Ogden, Logan, Salina, Price, Spanish Fork, Rexberg, Idaho, and Montrose, Colo., where Western Colorado Power Co. serves.

The UP&L program, carrying on unstintingly with full speed ahead despite uncertain times, will again use the tried and tested methods successful in the last five years, said Huckins. The program calls for expenditures of $625,000 in sales promotion, through farm exhibits, freezer activities, range and water heater promotion, home service, TV shows, commercial displays, planned lighting, Christmas program, sales training classes, adequate wiring promotion, traffic and safety lighting promotion and selling the free enterprise system. Huckins repeated the company's broad cooperative policy, Cummings its program of advertising, McAllister the market and its sales opportunities for dealers, Miss Hansen what home service helps would be given, Shaw the commercial potentials, Walker the industrial. An out-sized booklet with full details of the program was given to every trade outlet in the territory.

IEA also held a meeting of its retail division in Salt Lake City to go over with Loran M. Christensen, chief electrical inspector, the details of a proposed change in the sales control ordinance. Grounding of appliances used in wet locations would be required in the new version.

Ogden Chapter will stage another electrical exposition, April 25-26, at White City Ballroom. Last year more than 10,000 attended.

Electric League of Los Angeles—has moved to new headquarters at 2508 West Olympic, at Hoover. It now has larger quarters where there is a conference room, a library of industry periodicals and full association service facilities, according to Glen Logan, managing director. The reorganized and enlarged board of directors has been holding regular meetings to shape up the promotion program for the year, spearheaded by Jack Hargrove, president.

Appliance Merchandisers Assn.—Both the association and Central Arizona Light & Power Co. unite in a "Get it Done in '51" sales program and both have issued attractively printed and concisely stated programs that are coordinated toward that goal. The AMA, with Russ J. Morrissey, Mehagian's Home Furnishings Inc., as president, was organized in August 1950. Other Officers are E. A. Thomas, Arizona Wholesale Supply Co., vice-president; J. T. O'Neil, Home Supply Co., secretary; Leon Black, Black & Ryan, treasurer, and Jack Canady is full time secretary-manager. Because of Arizona's advanced climate the AMA's first big promotion of the year, a 3-day Food Freezer Show, was run March 23-25 in Phoenix. In April the promotion will be on evaporative and refrigerated cooling, in May on automatic laundries, June electric ranges.

Calapco's program, naturally, also included promotional plans for commercial and industrial load gaining and molding and has in it commercial and industrial shows, like the Lighting Clinic held there in February, a street lighting activity and irrigation development. As in San Diego, advertising on appliance promotions will be over the AMA signature, identifying the company through Reddy Kilowatt.

Northern California Electrical Bureau—With its best post-war year behind it, the bureau, with W. J. Lee, divisional merchandise manager, Sherman Clay & Co., San Francisco, re-elected its president, has launched its 1951 program with its $60,000 budget approved and a full program of appliance promotions, demonstration homes featuring electric living, adequate wiring and modern lighting, model school lighting, an "emergency" program of advisory service to members, a nutrition program and participation in county fairs, Leroy H. Bennett, manager, announced. Other officers re-elected were: C. R. Mathews, Westinghouse Electric Supply Co., vice-president; O. R. Doerr, PG and E Co., secretary; Frank K. Runyan, Western Merchandise Mart, treasurer; and J. S. C. Ross, chairman of the executive committee. A large directorate has on it representatives of manufacturers, wholesalers, contractors, dealers, broadcasters and others in the industry.

Jack Canady, secretary-manager of Appliance Merchandisers Assn. of Phoenix, and Glen L. Logan, managing director of the Electric League of Los Angeles, taken when both were "casing" the San Diego Bureau of Home Appliances conference

San Francisco Unit, like other units in northern California, elected its own officers. Claude L. Stout, Hales Appliance Stores, was named president succeeding George W. Baack, Record Hardware Co.; J. J. Marshall, Easy Washing Corp., vice-president, and C. P. McCarthy, PG and E Co., secretary-treasurer.

Inland Empire Electrical Dealers Assn.—A packaged $25,000 advertising program is being developed by this group in Spokane. There will be four special supplements in the Sunday Spokesman-Review, about 16 pages, featuring ranges in March, refrigerators and freezers in June, laundry equipment in September and appliances for Christmas in December, according to Robert Wilkinson, manager. Front pages will identify member dealers as Gold Seal appliance dealers and the services they offer. Each inside page will feature one brand, with a 45-in. display ad and news copy promoting the product, giving recipes, etc.

Gold Seal dealers will be listed by geographical area with the brands

they carry after their names. The association buys the entire supplement and resells pages to wholesalers and manufacturers and charges dealers for their listing and point-of-sale ads. There will be store banners tying in with the product promotion, window and truck decals identifying members as Gold Seal dealers, small decals to place on the appliances, a contest that will bring customers to stores to get a two-minute demonstration and an entry blank. Displays will be made in Washington Water Power Co. offices and much cooperative advertising will round out the program. Manufacturers increased their allocations to the area to help put over the March range initial program with success. IEEDA is also considering a two-day management institute to be run in April at the State College of Washington with the college staff assisting.

San Diego Bureau of Home Appliances—Preparations for the second annual Spring Fair of Frozen Foods & Refrigeration, April 25 through 29, in Balboa Park, are practically complete, J. Clark Chamberlain says. There will be 100% participation by refrigerator and freezer makes, a fine spread of frozen food and companion products, and Marjorie Hume, San Diego Gas & Electric Co. home service director, has arranged for 18 frozen food cooking schools by nine visiting economists from various manufacturers during the show. Attendance of 100,000 is expected. Current training classes include another series for basic sales training and a new course on effective sales speech.

Northwest Electric Light & Power Assn., Business Development Section—The annual conference will be held at the Multnomah Hotel, Portland, May 7-9, under the chairmanship of Guy Davis, Pacific Power & Light Co. A strong program of topics related to selling is in preparation.

Pacific Coast Electrical Assn., Business Development Section—With a workplan completed, this section has developed a program for its parallel sessions at the annual convention, Los Angeles, May 21-23, which will present the most interesting factors of accomplishment of each of its 11 committees. The workplan sets forth the purpose, the problems and then selects the objectives and the methods to be used in obtaining them for each group. The workplan has been prepared in a pamphlet form that can be had from association offices in Los Angeles and San Francisco. Chairman Rodger I. Mendes, PG and E Co., and the committees have

"Whole store a show window" is well illustrated by the design of Herb Names' in Denver which takes advantage of night theater traffic across the street to attract many to the display. The store is left lighted 'til after show time. The wide expanse of the window gives a view of the entire contents; set at a slant, reflections are shunted

crystalized into selected activities much of what usually is only nebulous and theoretical. The scope covers agricultural, wiring, commercial and industrial lighting, school lighting, LP gas competition, home economics, home lighting, kitchen and laundry equipment and television.

Maxwell's Inc., electric dealers and contractors in Spokane, after 22 years in a downtown location at First and Wall, will move to E. 14 Mission St., farther removed from the center of town but where it will have a parking lot for its customers, according to W. H. Maxwell, president. The building bought and remodeled will provide about the same amount of floor space.

IEA

George M. Gadsby, president and general manager Utah Power & Light Co., presented a moving picture *Power for Peace* at the luncheon meeting of Intermountain Electrical Assn., Salt Lake City, March 26.

Electric Clubs

Los Angeles Electric Club held its 30th anniversary birthday party March 19 with Art Howard, president, presiding and Sam Scott, Graybar, as chairman of the day. Scott reviewed the history of the club and greeted four of the eleven original officers and directors and some of the original members who were present. The club was founded Nov. 24, 1919, by Harry Harper, Glen Arborgst, K. E. Van Kuran, A. W. Childs; Harper being the first president. The first meeting of the original club was held on March 17, 1921, the first year having been spent in its organization and when charter memberships closed April 4, 1921, the total was 534. Carl M. Heintz was editor of the first weekly *Sparks*.

San Diego Electric Club elected Howard O. Craghead as its new president, with Ivan E. McDougal, Westinghouse Co., first vice-president; William J. Myers, Allis-Chalmers Co., second vice-president, and Carleton J. Bunce, San Diego Gas & Electric Co., secretary-treasurer. Directors are Jim Lyons, Lyons Rural Electric; George E. Jenner, San Diego Gas & Electric Co.; Marvin E. Musgrave, DeWitt C. Bertrand and William H. McKinley, past president, electrical engineer, City of San Diego. Its officers were inaugurated at a dinner dance with appropriate ceremony. Its March 20 meeting was addressed by William de Waard, San Diego Gas & Electric Co., who recently returned from an interesting trip through Europe. He showed motion pictures taken on the tour.

San Francisco Electric Club elected Roy Dreiman, Coast County Gas & Electric Co., as its president and re-elected Charles Huyck its secretary-treasurer, with directors Edwin Fleischmann, Graham Holabird, Fred Mulvany and William Lancaster.

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

April 1951 ©

Price control was put on margins on most everything but refrigerators and washers in a new order as this went to press. Previously all prices were frozen at January levels; refrigerators and washers still are. But now dealers are to make up a schedule of prices as of March 31, file a copy with OPS, keep the other around to be checked against by either G-men or consumers. Details available from nearest OPS office.

Margin control

Meanwhile sales have returned to normal, if there is any such thing. Inventories of most everything but freezers are ample, but customers with that big down payment aren't. Those who were scared have bought. The remainder are hanging on to their anemic dollars. Manufacturers have continued to roll out product at 80% of last year's all time high rate until some of them are putting on the brakes, too, until some of the warehouses empty. The real draw on raw materials for war goods has only just begun. It won't really draw full suction until fall when tooling is completed and the machines will chew up materials so fast civilian goods will be in a vacuum. So it won't stay normal long.

Foot slogging

Sales drooped in most areas of the West but despite inventory pressure there were only isolated cases of dumping. Those who cut TV prices found it did not sell sets; only made former customers mad they'd paid full price. Some white goods surplus has been slipped "out of town" on a deal to a builder. Even discount houses aren't buying anything but top brands. Wholesaler inventories were up too with more coming in.

Sales slip

Two western gals, one for the second time, won McCall Awards, which were presented at the EEI sales conference at Chicago, April 4. Mrs. Marjorie Hume, home service director, San Diego Gas & Electric Co., who won last year too, was one of five winners this year. Evelyn Hansen, home service director, Utah Power and Light Co., was another of the five winners, for a water heater presentation.

Bright gals

Comedians have kidded about it but Dr. R. Clark Jones, physicist of Polaroid Corp. actually demonstrated a gadget that unfailingly eliminated commercials, even singing ones, from radio programs without "losing so much as a note of music." About the size of a midget radio, it uses four tubes whose brains see a commercial coming and silence it. Should sell for a few dollars, but might upset radio economics.

Spiel silencer

Another electrical exposition, Sept. 1-9, has been decided upon by the Northern California Electrical Bureau, according to LeRoy H. Bennett. "Representatives of all branches are unanimous that a sound economy necessitates aggressive selling. Critical world conditions did not restrict our 1950 Wonderland." Many new features are being planned. It will keynote electricity for defense, industry and the home.

Big show

TV scan

Television began to unfreeze in Washington as FCC announced proposed allocations of channels in both VHF and UHF bands. With 13 VHF bands and 14 through 65 in UHF, FCC would still have 13 to 18 more to hold for future experimental purposes; even many small cities may have a channel or two. . Some applicants, such as Westinghouse station KGW, Portland, were reported placing orders for TV station equipment to speed installation when applications are processed. . Supreme Court has heard and is deliberating on the RCA-Columbia color squabble. There is some chance it may send it back to lower courts first. . Nothing more has been heard of the bills in California legislature to force the state universities to televise their games, but one bill in the mill would exempt a TV set from repossession, putting it in the same class as necessities like the bed and kitchen range. . Movie companies who have held back on letting TV have their films may find it hard to get their station licenses renewed or to get new licenses, FCC has hinted. . Television got tremendous publicity from the televising of the Kefauver hearings. But it raised the question of legal invasion of personal rights, to be shown all over the nation against one's wishes. . Zenith may ask FCC to let it try Phonevision in more areas, probably New York next. It will ask Canada to let it make a similar test. . RTMA has asked Federal Reserve Board to modify Regulation W to permit TV set trade ins to be applied against the 25% down payment. . Bills to examine and license radio-TV dealers and service repairmen in Wisconsin and Massachusetts, and a similar ordinance in New York City are being opposed by dealers and distributors. The bills have come from complaints of the public over service contracts not lived up to and to overcharges and some dishonest practice. The industry maintains that licensing is no cure for dishonesty and will become a burden on all. . Federal Trade Commission is watching TV and radio commercials to catch scare advertising or phoney references to defense production as reasons to buy. . Record dealers and their trade association in Philadelphia plead no defense and took $16,500 in fines for charges of price fixing.

Shot in arm

Big promotion to get TV sales back on the beam is under way by Bureau of Home Appliances of San Diego County. "New Horizons for TV" is its title. Started with a mass meeting of dealers and salesmen and technicians, addressed by Walter Elieson, U.S. Dept. of Commerce, on the business outlook. 17 makes are participating--Admiral, Capehart, Crosley, Emerson, General Electric, Hallicrafters, Hoffman, Motorola, Packard Bell, Philco, Raytheon, RCA, Sentinel, Sylvania, Teletone, Westinghouse and Zenith. Other meetings are being planned.

Integrating

Some big changes are going on in the appliance and merchandise departments of General Electric Co. All details are not yet released but expect some integration. What is announces is that an "Appliance Park" will be established somewhere in the middle west, maybe near Louisville, where for the duration war goods production will be done, but later it will be converted to appliance output and an institute like Nela Park is to lamps and Electronics Park is to electronics.

Feud

Bendix has obtained an injunction to restrain Borg-Warner from using its water control in a Norge automatic washer. The legal fight goes back several years and has kept Norge out of the automatic market.

Employee plan

Westinghouse has developed an employee purchase plan which channels the sale through a dealer who gives a 25% discount, half of which Westinghouse pays the dealer and replaces the item in the dealer's stock. There are safeguards to its not being abused. A special allocation plan was made for TV sets in short supply, one being set aside for each 100 employees.

"The Miracle of the Rainbow," a 15-min. color film, explains the revolutionary new Hotpoint dryer action, and is available to distributors and dealers. | Not dry

Philco has enlarged its factory supervised service program with the addition of more field engineers, more training classes, service kits and technical information, and materials by which dealers can sell their service and repair department to the public. | Up with service

Tube Koat is a new fast drying conductive coating for refinishing the outside of TV picture tubes that have become scratched or peeled. It can also be used to coat the inside of the cabinet to prevent high voltage leaks and static discharge. Made by General Cement Mfg. Co. | Refinisher

With 4 basic units and 9 drip pans Tuttle & Krift, Inc., makes it possible to replace surface cooking units on electric ranges with its Monotube units for any range, service departments are told. This reduces the inventory requirements. A pocket slide rule has been devised to aid in quick determination of the right unit for each range. | Versatile pack

Horton washers and ironers are to have a nation-wide promotion beginning May 1, according to Lou Swenson, general manager, Ray Thomas Co., southern California distributor. L. F. Koranda, sales manager of Horton Mfg. Co. recently met with Swenson and Norman Weber to set it up. | May drive

Hotpoint commercial equipment department is active on many fronts to keep the electric pot boiling. It is conducting a commercial cooking load survey among utilities, has made available a sectional display stand to hold the complete line of custom-matched counter equipment, has a $1,000 Sweepstakes cash prize incentive plan to encourage dealers, distributors and utilities to submit Hotpoint equipped mass-feeding establishments as entries in Institutions Magazine's 1951 food service contest and is advising as to application of DO ratings for commercial equipment and for maintenance, repair and operating supplies. | Cooking electrically

Seattle Appliance & Music Assn. tells its members that of the proposed legislation affecting dealers, there is no tax on TV sets, no need to take out an electrical contractors license or bond, retail sales of appliances are not controlled by the state, tax levy to support a band, orchestra or symphony was defeated, a sales control measure failed to pass, and tax supported colleges were not required to grant telecasting of their games. | No hits, no runs

California Toy, Variety and Notions Show opens in Los Angeles, at the Alexandria Hotel, July 22. . Midyear convention of National Appliance and Radio Dealers Assn. will be held June 25 at the Stevens Hotel, Chicago, at the time of the summer market. . Pot & Kettle Clubs national convention will be at the Gearhart Hotel, Gearhart, Ore., June 25-27. Convention theme is "The Beachcombers." The Portland club is host, and Holt Berni is convention chairman. | Shows, dates

Servel is now a triple threat. With a newly designed electrical heating element that operates as economically as motor compressors, Servel is now going after the electric refrigerator business with a motorless electric, or absorption unit, the only refrigerator with a 10-year guarantee, and with prices per cu. ft. better than many electrics. Where it can't sell electric it still can sell kerosene or gas. | Three aces

Keep the directory section that comes with this month's Electrical West. It brings you the most up-to-date list of manufacturers' and their western representatives, a directory of authorized repair parts and factory service stations for all appliances. This is one of the many real services which your Electrical West brings you. — Your guide

Conrac Inc. now has a TV chassis for building in to a home or a cabinet of your own choosing, with a 24-in. picture tube. Clyde Allen is agent in northern California and Luckanish Inc. a distributor. — Big for build-in

Household Products Co. of Oakland has been appointed distributor for Stewart Warner TV and radio for northern California and Nevada. Also handles Servel refrigerators and Estate ranges. — TV line

It is McCollum-Law Corp., distributors, now, as Auto Equipment Co. of Denver divided itself in two parts. Auto Equipment will continue with automotive parts and accessories. McCollum-Law will have household appliances and floor coverings. W. S. Law is general manager of the latter, with Bob McCollum as president of both firms. Address remains 14th and Lawrence until a new building is finished at 48th and Colorado Blvd. in May. — Twins now

In San Diego something like musical chairs is going on. Lee Distributing Co., handling Coolerator, Lewyt, Santinel, Sew Gem, Thor and Vornado, moved to new and larger quarters at 820 West Ash St., and Western Radio & TV Supply, handling Hoffman, moved that part of its activities into the space Lee vacated at 446 West Beech St. Then Ray Thomas Co. established a sales and service branch for Capehart TV and radio under Robert L. Jones, at 3432 El Cajon Blvd. Also Kierulff & Co. is said to be in process of establishing a branch in San Diego under Ed Nystrom. Motorola and Amana lines are theirs. — Dynamic area

Robert F. Clark Co., appliance distributors in Denver, will also have a new building in May or June, on Rio Grande Blvd. The company will represent an English line of radio sets, the Murphy. — New

Nash-Kelvinator Sales Corp. of Seattle becomes DuMont TV distributor in Seattle. — In TV

DeJarnatt Wholesale Radio Co. of Fresno has moved to larger quarters at 223 Fulton St. where it has more parking space and more facilities. — Expands

Metal restrictions are given as the reason for Manning Bowman & Co. sale of its Meriden, Conn. plant to Tropic-Aire, Inc. of Chicago. Manning Bowman has been forced to discontinue making its coffee makers due to metal shortage. Some of its other appliances will be made for it by other factories of McGraw Electric Co. which acquired it recently. — Pioneer sells plan

Century Distributing Co., distributing Emerson TV and radio, opened new quarters at 1111 Front St., San Francisco, with Joseph H. Weisman, president, and Conrad Platt, general manager, up from Los Angeles for the opening. S. J. Cooper is in charge of the SF house. — New house

Sues, Young and Brown, Inc., have a number of its salesmen eligible for trips to Hawaii and to Sun Valley as winners of its "Sell, Yell and Benefit" contest, based on points in selling Zenith, major and general appliances to their dealers. Don Jones was high man. SYB has a Sew-Gem, a Lewyt and a Coolerator drive going on now too. — Winners

These Made News—

Kitchen Designer

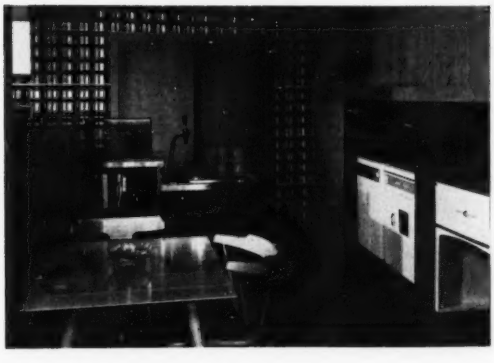
Bubbling over with ideas of how to make standard cabinets and accessories fit into unusual kitchen arrangements to give them the "custom" touch, Doris A. Piper, home economist in charge of kitchen planning for Crosley, toured the West to school distributors' kitchen specialists and home economists in these ideas. In San Francisco, at California Electric Supply, Adrian Greenberg had one of his "Kitchens by Adrian" for her to work from as she conducted a class for its salesmen and the home economists of Sacramento Municipal Utility District attending.

It's Rickish

That even a dealer with a small store in a suburb can do a big business is proved by Roy Rick, of North Hollywood, who sponsors a weekly quiz show, "Rick's Academy of Kitch-Anatomy," broadcast over KWIK, Burbank, by Bob Barker, MC, and his wife, Dottie Joe Giddeon, script writer, each Wednesday morning at the North Hollywood auditorium of Los Angeles Department of Water & Power and immediately following a cooking school conducted by Fay Newsome, home economist. A carefully screened invited audience of prospects, contacted at least three times by phone, provides a rich source of prospects.

Monterey Bay Get-together

Although neighbors around the big Monterey Bay, the dealers of Santa Cruz, Watsonville, Hollister, Gilroy, Morgan Hill, Monterey, Salinas and King City, some 190 dealers and salesmen, met for the first joint meeting of the three associations recently at Watsonville. A. B. Lindsay, Electric Appliance Co., Watsonville, welcomed the group and Larry Hall, Hall's Appliance Co., served as chairman. Joe Connelley, Servel Inc., was the guest speaker. Towns served by both Coast Counties Gas & Electric and PG and E were represented in the joint meeting.



A Laundry, Believe It or Not

It won the "Kitchen of the Year" award from the American Legion convention, and this end is the laundry section of the $5,000 kitchen and laundry combination, shown in the Los Angeles branch of General Electric Appliances Inc. It opens on an outdoor patio equipped with barbecue. This laundry room doubles as a breakfast room, and on occasion, because it also has a soda fountain at the end of a snack bar, as rumpus room. Sliding doors conceal the laundry equipment when not in use. The other half contains push-button range, two-section refrigerator, dishwasher sink and disposal, and other appliances.

Above, general view of the show. At right a group of the 1951 show committee: front row, Harold S. Davis, G-E Co., past president; Morey Sherwin, Interstate Restaurant Supply; F. J. Rohring, So. Calif. Edison Co., EMEA president; Dick Rogers, Ace Day & Night Electric, second vice-president; Ralph Weston, Culver City engineer; middle row, Marion Allen, executive secretary EMEA; Henry Bente, A. L. Martin Co.; Leon Dame, So. Calif. Edison Co.; back row, Henri Ledebour, 20th Century Fox Studios, past president; J. J. Bechard, Pioneer Flintkote Co.; Jack Pyle, General Cable Co. (retired), show publicity chairman; Elmor Croft, Cole Instrument Co.; George Larsen, Larsen-Hogue Electric Co., show director; Jerry Ellis, Knudsen Creamery Co. (retired), show entertainment chairman. Not present were Bruce Graham, John Benson, and Floyd O. Nelson

Industrial Electrical Show Attracts

Its purpose to reach plant executives, managers, maintenance men, superintendents, chief engineers, purchasing agents, electricians, as well as electrical contractors, wholesalers, lighting engineers and utility personnel, the fifth annual Industrial Electrical Show of the Electrical Maintenance Engineers Assn. of Southern California was visited by over 6,000 of such men during its March 15-17 showing at Shrine Convention hall, Los Angeles. There they saw commercial and industrial electrical equipment, lighting fixtures and devices, tools of many kinds, communication equipment, instruments, industrial heating devices, materials handling tools and similar materials. It was strictly an industrial show, with no entertainment except the joy of watching new gadgets operate—a pleasure enjoyed by all mechanically minded males. There were some 65 exhibitors

Materials for rewiring and extensions were shown Henri Ledebour and Roy Dahlin, by Harry Barnard of F. J. Airey Co. Inc.

Ohio Carbon Vice-President F. C. Aurand was there with Art Howard, Tri-State Supply, to greet Mr. and Mrs. J. F. Beatz

Feature event on last night of the show was presentation of Industrial Advertisers Assn. award for the three most attractive exhibits, selected by the Purchasing Agents Assn. During that ceremony Don Hansen, West Coast manager, Oil & Gas Journal and vice-president, Industrial Advertisers Assn., presented the awards, and Wallace B. Stanford, Phelps-Dodge Co., represented the Purchasing Agents Assn. Winners of the awards were: National Electrical Products, first prize, received by Harvey Brady; U. S. Motors, second prize; Andrey Co., third prize, received by L. E. Anderson. In the group around the show's central revolving pylon with its flashing lights, were also George Larsen, Larsen-Hogue Electric Co., chairman of the show committee, and Jack Rohring, EMEA president. At right, a view along one of the aisles of exhibits at the annual Industrial Electrical Show

Engineers for Defense Production Ideas

showing between 150 and 175 lines. No door prizes were given out this year, the exhibitors preferring that the visitors not be drawn away from their business contacts in the exhibits themselves. From the EMEA central headquarters recorded music was played, that was all. On the balcony nine industrial and educational movies were shown for those resting from the touring of the exhibits. The show received a good press and Station KTTV televised the show on Friday in its newsreel. It also publicized it on the Sunday before it opened. Two trade schools, Los Angeles Trade-Technical Junior College and Santa Monica Technical School, conducted live demonstrations of training work. The one touch of "glamor" was the Van Cleef "Dutch Girl." The EMEA members themselves set up the backgrounds and wiring for the show, then take it down and store it for next year.

One big attraction was the transparent model of a General Electric turbo-jet aircraft engine, which Hal Davis explained

At the prize winning National Electrical Products Corp. display, Bill Hunt and Harvey Brady were ever busy with customers

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Sturrock

Problems and Opportunities

in lighting field compounded by defense mobilization and technological progress, speakers tell IES group

That lighting problems and lighting opportunities have been compounded by the defense mobilization program was the consensus at the Fifth Annual Northwest IES conference held at Spokane March 22 and 23. Much present-day research and many new applications are tied to the rearmament effort, IES President Walter Sturrock of the General Electric Lamp Department, Nela Park, told the gathering.

President Sturrock reported that a Defense Coordinating Committee revived from World War II is active on a variety of projects including the utilization of technical manpower and the direction of various restricted research activities. Even so the IES is not giving up its continuing research program for fundamental lighting knowledge and its application to practical uses, Sturrock said. As an example he cited the work with glare factors. A new technical committee on mine lighting and a new project on illumination standards and techniques for restaurant, hotel and institutional kitchens have recently been organized, he reported. He said that the IES is expanding its membership fields especially among electrical contractors and optometrists and has set a goal of 10,000 members.

Drawing on past events and past performance George C. Tenney, editor of Electrical West, showed how time and technological progress tend to intensify problems and increase opportunities. He showed how new developments and new equipment bring about new standards and hence new market potentials. Street and highway lighting and home lighting were cited as examples. Illumination of dangerous intersections on the West's 60,662 miles of primary highways represents a market opportunity of $7½-$15 million, he said, while the application of the new recipes for good home lighting to 250,000 new residences being built in the West each year would mean the sale of fantastic volumes of lighting equipment.

Tenney pointed out that, when the first school lighting standards were drafted in 1922, only one school in ten was adequately lighted. The same situation exists today after 28 years of progress and the 110,000 school classrooms in the West offer the industry potential markets of $20 million for fixtures, $8 million for rewiring and $1 million for annual lamp renewals. When a NWEL&PA committee urged the adoption of a 15 f-c minimum level of illumination for stores in 1924, Tenney said they were pioneering, yet today the recognized minimum is 30 f-c and 100 f-c is not unusual. Application of the Indianapolis lighting market survey findings to the 291,000 retail stores in the West gives the lighting industry market potentials of $17½ million for incandescent relighting and $105 million for fluorescent, he said.

"Whatever our concept of present standards may be or how courageous our predictions for the future, our opportunities and potentials will always be found to exceed our fondest expectations despite our progress," he concluded. "And why not? Ours is the most dynamic industry in America with an unparalleled record of planning, of initiative and of achievement. For such an industry the future is always full of challenges and opportunities."

Glass, whether for lighting or for any other application, is just coming of age, Harold G. Vogt, research physicist, Corning Glass Works, told the conference. Using a variety of samples and demonstrations, he showed the recent progress in glass development and applications. Of special interest was the new 96% silica glass which has mechanical, thermal, chemical and dielectric characteristics adaptable to a wide variety of illumination applications. Vogt showed that tempered glass also has many potential uses. Mass-produced optical glass has made this country completely independent of outside sources, he reported.

Other new glass developments demonstrated by Vogt included a sheet with photo-sensitive characteristics incorporated in the glass itself and foam glass. The photo-sensitive glass reacts to ultraviolet light in the same manner as photographic paper. By annealing after exposure, the picture or design seemingly becomes part of the glass itself. Suitable designs make this glass serve as a special purpose refractor. The foam glass has many potential applications as an insulation.

The diversity of the characteristics of these new glasses make engineered design essential in developing new applications, Vogt said. Glass fibers are only beginning to find potential uses, he reported.

All of the benefits of good lighting installations are intensified when applied to defense production, Benjamin S. Benson, chief illuminating engineer, Benjamin Electric Mfg. Co., told the conference. Maximum accuracy in production where quality is not inspected into, but rather built into, a product requires ideal lighting, he insisted. Benson urged that good general lighting be incorporated into defense plant illumination layouts so as to permit maximum flexibility in arranging assembly lines.

Elimination of accident hazards alone warrants the best possible lighting installation, he said, pointing out that 15-25% of industrial accidents are caused by poor lighting. He cited a survey of one large industrial plant where accident rates were cut 32% following relighting and an additional 16½% after repainting. The overall reduction of 43% more than justified the cost, he said.

Protective lighting is essential for defense plants, he insisted. He listed the following essential characteristics of a good protective lighting installation: (1) It discourages or deters intruders. (2) It makes detection certain. (3) It avoids glare in the eyes of guards. (4) It provides complete reliability. (5) It provides adequate illumination.

Benson's presentation stimulated considerable discussion regarding the handling of protective lighting during blackouts, especially since radar will reveal targets that are not

lighted. Consensus was that protective lighting would be treated like any other light source and that reliance against sabotage during blackouts would require additional guards.

John Marshall Ziv, Luminall Paint Co., Chicago, gave the conference a fascinating and informative discussion on "Color in the Coordinated Classroom." In it he reviewed the psychological and physiological reactions of school children to light and color as developed from the Harmon studies. He showed how proper environment will eliminate physiological stresses which cause visual difficulties or other physical handicaps or unsatisfactory mental development and performance.

Functional synthesizing of painting, daylight control, artificial illumination, seating and other physical aspects of the classroom, he said, will produce a "coordinated classroom" where children will react with maximum efficiency. Light colors with adequate reflectance and reflecting surfaces for brightness and contrast control are essential, he said. Artificial illumination, he reported, should supplement the optically balanced distribution of natural light and maintain its quality and distribution if daylight becomes inadequate.

Progress in fluorescent lighting was reviewed by T. C. Sargent, Sylvania Electric Products Co., Swampscott, Mass., who measured fluorescent development by citing the change in manufacturing output in the 1940-50 decade. In 10 years, he said, the fluorescent-incandescent ratio of units manufacturing output in the 1940-1-100 to 1-10. He applauded recent efforts to achieve color standardization because without uniformity it is impossible for the customer to identify a desired color satisfactorily. Even so, he reported, the situation "is still comparable to 'So What and the Seven Whites.'" Changing circuits and changing ballasts, he declared, are disturbing to the lamp manufacturers.

Sargent demonstrated the new "area" light source produced by coating glass with a minutely thin conductor material and then superimposing a fluorescent paste and a sheet of foil to produce something similar to a condenser. Further development of this new source may make possible luminescent glass walls or ceilings, he said. This new source was first announced at the IES Pasadena meeting last year.

He also demonstrated the new Sylvania-Corning heat lamp that has been developed as an electric cooking element. A 1,250-w lamp is already available, a 1,500-w unit is in the pilot stage and a 2,100-w lamp is in the laboratory, he reported. In addition to cooking he predicted a wide variety of potential industrial applications for the new lamp. It already has found a use in the printing industry which makes possible paper speeds of 1,200 ft/min on presses.

Three papers presented at the national IES meeting in Pasadena last summer were reviewed at the conference. C. M. Cutler, General Electric Co., Nela Park, presented J. P. Dichman's discussion of "Lighting for Agriculture" and Carl L. Allen's discussion of "School Auditorium and Stage Lighting." Walter Lind, Canadian General Electric Co., reviewed H. C. Jones' paper on "Lighting in Canadian Churches."

The Spokane conference was arranged by Blair E. Plowman, Washington Water Power Co., and Dave Mozes, General Electric Supply Corp., as co-chairmen, with David G. Parker, Columbia Electric & Mfg. Co., as program chairman. The 1952 Northwest conference will be sponsored by the British Columbia Section at either Vancouver or Victoria.

IAEI

Dates have finally been settled for the series of annual chapter meetings of International Association of Electrical Inspectors in the Rocky Mountain region. The Utah Chapter leads the procession with its annual meeting in Salt Lake City April 17. The Rocky Mountain Chapter follows, April 19 and 20, at Denver. The Idaho Chapter meets at Boise April 23. The Montana Chapter meets at Butte, April 26-28. A first meeting for the Nevada Chapter, originally scheduled for April 20 and 21, was postponed until May 11 and 12. Robert A. Peterson, assistant technical secretary, IAEI, of Chicago, will be at the various meetings to discuss changes in the new 1951 edition of the National Electrical Code.

Northern California Chapter—Prentice Wilson, Santa Rosa electrical inspector, elected president of the chapter at the previous meeting in January, presided over a March 10 meeting at San Mateo. Besides discussion of code questions submitted by members during the interval, Robert Maxwell, San Jose, suggested that steps be taken through channels to ask the manufacturers of switches to manufacture a 300-amp main switch. He said the inspectors found a need for a switch in between the present 200 amp and 400 amp because in many instances this was too big a step. Numerous loads of 220 and 250 amp are being installed. Such loads, he felt, are not protected by a 400-amp switch and the customer is also penalized in cost for the larger size which likewise uses much more copper.

Harry Moore, past president of the section, was made an honorary member of the chapter. He retired as Modesto city electrical inspector in January. Next meeting of the chapter will be a joint one with the Central California and the Sacramento Valley chapters at Modesto May 19.

Oregon Chapter, presided over by James Vernon, met in G. E. Supply Hall, Portland, and discussed the new branch circuit changes in the National Electrical Code. W. R. Volheye explained the 20-amp circuits were designed to get rid of No. 14 wire and that tests on cords had shown them to cause no problem. Asked about type S fuses, Volheye said he believed that the mandatory requirement would come in. Another subject was high-voltage lighting in residences, hazards from dust in some locations and grounding.

Puget Sound Chapter met under Chairman D. D. Dunhaver at Olympia March 3, heard a report on the legislative activity to change the licensing and examination of contractors. Most of the bills were reported to have been tied up in committees. A sales control bill was opposed strongly by drugstore operators. Much of the discussion centered on how to acquaint legislators, the public and various industry groups on any proposed legislation as a means of getting agreement and not opposition. The group also discussed steps to be taken as material shortages develop to meet emergency requirements. A local committee was named to pass on such rules for local shortages until the national committee has rendered a decision. Next meeting will be in Tacoma June 2.

Utah Chapter held both a regular and special meeting recently under Chairman R. K. Williams. Plans for the annual meeting, set for April 17, were discussed by L. B. Johnson but the main topic was a proposed new code for the city of Salt Lake City. The NECA had prepared one code which G. A. Howarth, its manager, presented. L. M. Christensen, chief city electrical inspector, had prepared another and the group sought to reconcile the two.

Electrical Inspectors' Assn. of British Columbia of which L. E. Ryan is president held a meeting March 12 at which study group reports on trailers and trailer camps and low services were heard.

PANORAMA OF THE PCEA

Edited by A. X. Schilling

Convention Program Announced

Beginning with the opening gavel sounded by President F. A. Tracy, Sierra Pacific Power Co., on May 21, there will be something of interest to delegates every moment until the 1951 PCEA Convention closes on May 23, according to the plans of the committees working on this year's event. The convention will open with a general assembly on the opening day, followed by similar meetings on the next two mornings, while parallel section meetings will be held during the afternoons of the first two days. It will conclude with the annual business meeting and election of officers on the morning of Wednesday, May 23.

Luncheon meetings are scheduled for the first two days, the Monday noon meeting being a joint session with the Los Angeles Electric Club. The annual cocktail party, banquet and dance will be held Tuesday evening, May 22, in the Biltmore Bowl, with entertainment and music for dancing furnished by the regular Bowl entertainers and band. Dress for this affair will be formal for ladies, optional for men.

These are the members handling the many details connected with the convention: R. D. Moody, Allis-Chalmers Mfg. Co., general convention chairman. J. H. Adams, Southern Calif. Edison Co., is stage manager; assistant stage managers are: C. R. Nickerl, E. M. Tallon and R. H. Adams, all Southern Calif. Edison; W. J. Herz, Sierra Pacific Power; William Mazaris, G-E Appliances Inc.; E. B. Kramer, Westinghouse Electric Supply Co., and V. C. Redman, PG and E.

Committees are: program, G. N. Hawley, Southern Calif. Edison, chairman; O. R. Doerr, PG and E; E. M. Ellis, General Electric; L. G. Berger, Westinghouse Electric Supply; G. C. Tenney, McGraw-Hill Publishing Co.; A. X. Schilling, Southern Calif. Edison.

Attendance: D. D. Smalley, PG and E, chairman; Harold Quinton, Southern Calif. Edison; A. E. Holloway, San Diego Gas & Electric; C. C. Ernst, Calif. Electric Power; A. R. Bailey, Coast Counties Gas & Electric; H. P. Dayton, Sierra Pacific Power; H. P. Sargent, Central Arizona Light & Power; Reid Gardner, Arizona Edison; R. W. Turnbull, General Electric; W. J. Maytham, Westinghouse Electric Corp.

Banquet: T. T. Kennedy, The Okonite Co., chairman; H. S. Christensen, Southern Calif. Edison; J. L. Tindale, Anaconda Wire & Cable Co.; T. B. Jones, General Cable Corp.; G. R. Best, General Electric; W. M. McKenney, Phelps-Dodge Copper Products Corp.; L. M. Guibara, U. S. Rubber Co.; S. L. Hall, Electric Supplies Distributing Co.; L. E. Starkweather, Leo J. Meyberg Co.; J. E. Redmond, J. E. Redmond Co.

Cocktail Party: H. S. Warren, Rome Cable Corp., chairman; C. R. Biggs, General Cable Co.; R. M. Marston, General Electric; G. F. Rucker, Leeds & Northrup Co.; P. K. Churchill, Line Material Co.; H. J. Randolph, H. J. Randolph Co.; G. F. Black, Rome Cable; Karl G. Kempf, Thomas & Betts Co.; E. E. Karsten, Gough Industries Inc; C. P. Soderberg, Westinghouse Electric Supply.

Golf: R. F. Gheen, Ohio Brass Co., chairman; G. B. Kirkwood, Pacific Electric Mfg. Co.; C. E. Germaine, Crosley Div., Avco Mfg. Corp.; C. H. Thrane, General Electric Supply; E. C. Lampe, General Electric Supply; R. T. Redfield, Graybar Electric Co.; C. R. Mathews, Westinghouse Electric Supply.

Hotel: S. W. Scarfe, General Electric, chairman; Wayne N. Johnson, Southern Calif. Edison; W. S. Fleming, Calif. Electric Power; J. G. Foster, Coast Counties Gas & Electric; Warren LaBarr, Allis-Chalmers; R. B. Borland, Westinghouse Electric; K. C. Moulton, General Electric Supply; E. A. Galchutt, Graybar Electric; W. H. Park, PG and E.

Ladies' entertainment: J. A. Long, Southern Calif. Edison, chairman; H. A. Lee, PG and E; H. G. Dillon, San Diego Gas & Electric; L. S. Heseman, Calif. Electric Power; R. L. Hayden, Coast Counties Gas & Electric; J. H. Pengilly, Square D Co.; Garlan Morse, Sylvania Electric Products Inc.

Publicity: G. R. Haysel, Southern Calif. Edison, chairman; Harry McMasters, PG and E; Roy Dickerson, San Diego Gas & Electric; W. O. Kyte, General Electric; C. R. Johnson, Westinghouse Electric; J. A. Robinson, McGraw-Hill Publishing Co.

Reception: S. W. Scarfe, Graybar Electric, chairman; M. C. Wells, Sues, Young & Brown Inc.; H. C. Gerster, General Electric Supply; E. A. Thomas, Arizona Wholesale Electric Co.; Squire Johnson, Acme Steel Co.; E. W. Morris, Westinghouse Electric; W. T. Scott, General Electric; W. I. Buchanan, Frigidaire Div., General Motors Corp.; E. A. Nickelson, California Pacific Utilities; L. G. Peck, Calif. Electric Power; W. F. Chapman, San Diego Gas & Electric; A. J. Noia, PG and E.

Registration: C. C. Potts, Westinghouse Electric, chairman; F. K. Duerst, Westinghouse Electric; D. L. Trott, R. E. Cunningham & Son; J. M. Culverwell, Kortick Mfg. Co.; I. C. Mathewson, Allis-Chalmers; Charles Grunsky, Coast Counties Gas & Electric; S. W. Robinson, San Diego Gas & Electric; George Whitney, Southern Calif. Edison; J. L. Buckley, PG and E.

Transportation and general information: N. V. Arntzen, Hubbard & Co., chairman; H. R. Edwards Jr., Hubbard; J. H. Gumz, PG and E; H. J. Letts, Southern Calif. Edison; H. B. Wylie, San Diego Gas & Electric; C. R. Coulter, Calif. Electric Power; G. E. Bishop, Coast Counties Gas & Electric; C. O. Martin, Benjamin Electric Mfg. Co.; R. D. Johnson, General Electric Supply; W. W. Kenney, Graybar Electric.

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Size for size, Deltabeston* AVA cables carry more current than ordinary cables—pack more current into raceways—because heat-beating asbestos insulation permits higher operating temperatures. When you specify G-E Deltabeston cables,
HOW MUCH CURRENT CAN YOU ADD?

2. WHAT REALLY MAKES THE DIFFERENCE IN CONDUIT?

Wiring installations get double-protection with General Electric White rigid conduit. First, the top-quality, thoroughly-tested steel pipe is galvanized. Then a tough, smooth coat of Glyptal* lacquer is applied.
BUT WHAT REALLY MAKES THE DIFFERENCE?

ANSWERS

1. ☐ G-E Deltabeston AVA cables can add as much as 64% more current-carrying capacity than ordinary cables with 60 C rating.

2. ☐ G-E White rigid conduit is *hot-dip galvanized* in pure zinc—a premium finish that gives lasting protection.

3. ☐ In laboratory tests General Electric mercury switches stand up under more than a million On and Off cycles—about 247 years of normal use.

4. ☐ The new standard grounding outlet (GE3588) is designed to take three-prong grounding plugs, two-prong polarized plugs, and regular two-prong parallel-blade plugs.

5. ☐ The new line of G-E bar hangers offers you the offset you need. New design lets fixture stud move easily for leveling and positioning, locks it tight when it's set.

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CAN YOU GUESS HOW LONG?

4. WHAT'S THE NEW STANDARD GROUNDING OUTLET?

For easy installation the new standard G-E twin grounding outlet can be side wired or back wired, but
WHAT'S THE NEW STANDARD?

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FOR FURTHER INFORMATION on any General Electric wiring materials, see your local G-E Construction Materials Distributor, or write to Section K53-425, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

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GENERAL ELECTRIC

PCEA Booklet

PCEA's newest booklet, *Your PCEA and How It Operates,* will go into the mail soon to all members. In interesting fashion, the booklet outlines the association's history, the achievements of its various committees, the mechanics of the group, and the methods by which members may obtain greater value from their membership.

The booklet was prepared by the advertising committee, of which F. M. Raymond, San Diego Gas & Electric Co.'s advertising manager, is chairman. It will be used by the membership committee to acquaint prospective members with the value of belonging to PCEA. Present members will receive it by mail soon and will find it interesting and helpful in affording opportunities for each member's greater participation in PCEA affairs.

F. A. Tracy, right, president of the Sierra Pacific Power Co., acts in his capacity as president of the Pacific Coast Electrical Assn. in accepting from V. W. Hartley, PCEA's managing-director, the first copy of the booklet "Your PCEA and How It Operates," which will be distributed to present and prospective PCEA members

NECA

Dates for three regional conferences of the NECA to be held in the West in April and early May have been decided. District 5, which embraces Texas, New Mexico and Arizona, will meet at the Westward Ho Hotel in Phoenix, April 23. District 6, embracing California, Oregon, Washington and Nevada, meets at Sacramento April 27 and 28. The District 8 meeting will be held at Billings May 4 and 5.

New Officers for San Diego County Chapter, NECA, were installed at a banquet Feb. 26 at Henry Langhorst Cafe in San Diego, according to Peter Montgomery Jr., secretary-manager. The officers are: Charles M. Sieger, Owl Electric Co., San Diego, president; Earl Pridemore, Pacific Electric, San Diego, vice-president; Joe Bollinger, Coronado, treasurer; and directors are Past President Tom Ford, Bay-Boulevard Electric; A. C. Eddy, Ets-Hokin & Galvan; Oscar Lundberg, Capitol Electric Co., and Norman Ferguson, California Electric Works, of San Diego. Tom Ford was elected governor to represent the chapter.

Rocky Mountain Chapter at Denver heard about Sylvania Electric Products Inc. "Lighting Contractor" promotion program at its last general meeting. Also introduced was Bill Blackmar, new manager of the Montana Chapter. A joint Colorado Springs and Pueblo meeting was held March 21 at which Ralph Johnson, District 8 vice-president, talked on "Governmental Regulations."

California Conference of NECA chapters met in San Francisco March 17 to review various negotiation problems among the various chapters and locals of the union. The problem of travel expense or travel time seems to be one of the troublesome ones and it was said that a friendly suit is to be instituted in San Francisco to get a legal interpretation of the wage and hour laws regarding this problem. Various bills affecting the construction industry now before the California legislature were discussed and the conference voted to support the State Builders' Exchange's legislative committee. The Los Angeles Chapter reported a legal action it contemplates against employment by a state agency of an unlicensed contractor for installation of a speaker system. Officers elected were: R. Goold, Stockton, chairman; C. D. Bronson, Oakland, vice-chairman; W. H. Welsh, Sacramento, secretary-treasurer.

Electrical Contractors Society

Approximately 75 members and guests of the Electrical Contractors Society of Washington enjoyed entertainment, a speaking program and a banquet at the fourth annual dinner of contractors and suppliers held in the Frye Hotel in Seattle on the evening of March 12. Art Siegal of the Selo Electric Co., president of the state-wide organization, presided at the meeting, assisted by William Griffith, station director of Radio Station KING, who emceed the entertainment in an extremely rapid fire and pleasing manner. Plans for the get-together, which was preceded by a cocktail hour, were prepared by Ralph T. Neilson, executive secretary-manager of the contractors society.

Principal speakers included Neilson, who discussed the society's place in the construction field and outlined plans for increasing the organization's membership; Art Dodds, Seattle building department, who proffered all possible aid in solving the problems arising through necessary substitution of materials; John Hewitt, state electrical inspector, who spoke of changes in the state electrical code and on the sales control bill; Julius Hooper, a past president of the society, operator of the Hooper Electric Co., who "plugged" for the young men breaking into the industry; Jim Hartwig, manager of the Seattle office of the North Coast Electric Co., who outlined supplier problems as they relate to the contractor's present set-up, and Boris Kramer, an attorney for the Office of Price Stabilization, who detailed at length the specific objectives of the newly organized government control agency.

IES

Walter Sturrock, president of the Illuminating Engineering Society, in addition to speaking at the Northwest Regional Conference at Spokane met with the Southern California Section March 13, the Northern California Section March 14, the Oregon Section March 21, the British Columbia Section March 16 and the Utah Chapter March 26. At each he gave much the same talk, reviewing the activities of the society, as he gave to the regional conference in Spokane, reported on page 96.

Sturrock also addressed the Electric Club of Los Angeles March 12, telling "How the Electric Industry Has Benefited by IES Researches."

Another celebrity attending and speaking at the regional conference, B. S. Benson Jr. of Benjamin Electric Mfg. Co. addressed the Utah Chapter April 2 and the Northern California Section March 29, the Southern California Section April 4.

NAED

National Assn. of Electrical Distributors, Pacific Zone, is making plans now for its annual spring meeting at Arrowhead Springs Hotel, San Bernardino, May 2-4. E. A. Phillips of Phillips & Edwards, San Francisco, is chairman, and R. A. Balzari, secretary, is making the reservations.

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THE MONTH IN BRIEF

Injunction Against WWP Sale Made Permanent

Following hearings March 27 and 28 at Colville, Wash., Judge B. B. Horrigan of Pasco made permanent a temporary injunction against sale of Washington Water Power Co. to a group of eastern Washington PUDs. The injunction was asked in a taxpayers' suit. Way was left open, however, for new efforts of PUDs in Chelan, Stevens and Pend Oreille counties to purchase WWP properties within the state or to condemn individually properties within the separate counties. Judge Horrigan said that he did not believe the 1949 Washington PUD law gave authority to acquire properties outside the state, and about 25% of the company's system is in Idaho. W. L. Thrailkill, assistant general manager for WWP, pointed out that the three PUDs use less than half the power generated by company facilities within their boundaries; therefore can get along without the rest of the system. Counsel for the taxpayers' group also argued that 90% of WWP customers are located outside the three affected counties. R. W. Beck, PUD analyst, testified that PUDs could reduce rates through freedom from federal income taxes now paid by WWP amounting to $1,700,000 annually. He added that PUD percentage payments in lieu of direct state and local taxes would total $1,414,000 compared with $1,627,000 paid by WWP.

FPC Warns Its Approval May Be Required

FPC last month advised Washington Water Power Co. that proposed sale of its assets or stock to PUDs may involve transfer of its FPC licenses and require prior commission approval.

WWP Asks Permit for Montana Site

Washington Water Power Co. has applied to FPC for preliminary permit for a proposed hydroelectric development in Montana. Site would be on the Clark Fork River in Sanders County; project would include a power house with rated capacity of 197,000 hp and a reservoir about 17 miles long.

PUD Backers Win in Legislature

The Washington state senate, favorable to the proposed bill to require voter approval for a PUD purchase of Spokane properties of WWP, backed down under house opposition and accepted the PUD substitute, which permits Spokane to condemn PUD-acquired properties in the city within five years. PUDs also secured passage of bills to permit them to organize local utility districts for construction of rural street lighting systems and to liberalize bidding procedure and enable more work by force account. They killed legislation that would have permitted their dissolution, that would have permitted small cities and towns to operate power systems in adjacent rural areas and that would have required licenses for installation of wiring-in rural areas.

State-Financed Steam Plants Killed

A bill that would have financed construction of steam electric plants by the state has been defeated in the Washington legislature. Proposed by Governor Langlie, the measure would have imposed a license fee of half of one per cent on power bills of all ultimate consumers of electricity in the state.

Two Towns Reject, One Accepts Purchase Plan

The towns of Houghton (King County) and Puyallup (Pierce County), Wash., have voted down proposed bond issues ($350,000 and $1,600,000 respectively) for purchase of Puget Sound Power & Light Co. facilities. Sumner in Pierce County voted to acquire Puget Power distribution facilities. No sum of money was specified.

May Operate Competing Systems

Because of improper election notice, the town of Newport, Wash., was enjoined from proceeding with plans to set up its own distribution system in competition with the Pend Oreille PUD. The state supreme court which handed down the decision ruled, however, that there is no law preventing two municipalities from constructing and operating separate electric distribution systems in the same area on a competitive basis.

No Right to Be Competition Free

Circuit Judge George R. Duncan at Salem has upheld Oregon PUC Commissioner Flagg's order allowing Mountain States Power Co. to reduce its rates at Springfield, Ore., to meet competition of that city's municipal power system. The court action dismisses a suit brought by the city to restrain the power company. Judge Duncan held that the city has no legal right to be free from competition and that, neither a customer nor stockholder of Mountain States, and not suing in behalf of citizens of the city, it had no legal right to bring suit.

Transformer Plant Reopens

General Electric Co.'s Oakland, Calif., transformer plant, closed late in February after being strikebound for four months, was reopened on April 2. Late in March striking UE members voted to reverse their stand on a proposed incentive program, to accept without reservation a G-E offer of Jan. 31 and to urge the company to reopen the plant. Members of the United Electrical, Radio and Machine Workers of America struck when the company proposed a piecework incentive plan, similar to those in effect at other G-E plants. A recent $2 million modernization had failed to bring hoped-for reductions in manufacturing costs and the incentive plan was believed the only way to put the plant on a money-making basis. Company spokesmen said that the new plan would allow workers to increase their earnings from 15 to 20%.

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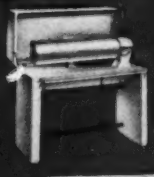

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THIS MONTH'S NEWS

Private Companies Will Add 400,000 kw in Northwest

Five privately owned utilities in the Pacific Northwest will add more than 400,000 kw to the area's production of electrical energy within the next two years. This contribution, together with 150,000 kw from PUD projects, will produce more than half the generation which the Defense Power Administration has said will be required to meet defense needs.

Reports on generating facilities from these non-federal projects now under construction or awaiting go-ahead signals were given to the Bonneville regional advisory committee, meeting at Portland. They are:

Portland General Electric Co.—Pelton Dam on the Deschutes River in Oregon, to be completed in 18 to 22 months, will provide 120,000 kw.

Washington Water Power Co.—Cabinet Gorge project in Idaho, due for completion by the fall of 1952, will provide 100,000 kw.

Pacific Power & Light Co.—Yale Dam on Lewis River in southwestern Washington, awaiting go-ahead signal, would be completed in 1952 and would generate 108,000 kw.

California-Oregon Power Co.—Three small generating plants will add 40,000 kw to the Northwest power grid this year. Applications for three additional plants to produce 90,000 kw are being processed.

Seattle City Light—Installation of new generation on the Skagit River in June of this year will provide 40,000 kw. Later three other generators will be installed at Ross Dam.

Chelan County (Wash.) PUD—Raising of Rock Island Dam and addition of six new generators will produce an additional 150,000 kw in 1952.

Study of Sultan Dam As Defense Project Approved

The Snohomish County PUD of Everett, Wash., has authorized the Harza Engineering Co. of Chicago to explore the possibilities of getting the government to defray the cost of preparing plans for a proposed Sultan River hydroelectric development as a defense power project.

Calvin W. Davis, Harza vice-president, told the PUD that a Defense Electric Power Administration official had expressed "unusual interest" in the Sultan project because of its "nearness to load centers, peaking capability, low cost, minimum requirements for critical materials and other factors."

Harza has made surveys for the Sultan project but R. W. Beck & Co., public utility analysts, advised the PUD it would be uneconomical for the PUD to finance the project by itself.

New Contracts Called on Albeni Falls Project

With a $3,839,148 contract awarded for second-stage construction of Albeni Falls hydroelectric project in northern Idaho, the Corps of Engineers has called bids for three 15,800-kva generators to be installed in the dam's power house.

The generator bids were to be opened April 12 at Seattle. Completion of the first generator is required by Aug. 1, 1954, with the third due April 1 of the following year.

Contract for second-stage construction was awarded to the Donovan-James Construction Co., with completion specified by April 15, 1952. Excavation is proceeding under an earlier contract on a two-shift basis, seven days a week.

Edison Steam Plant To Get Colorado River Water

Southern California Edison Co.'s new Etiwanda steam electric plant has been assured quantities of Colorado River water up to 15,000 acre-ft a year under contract provisions between the utility and the Metropolitan Water District. Two existing conditions will make water delivery convenient. A main feeder pipeline of the Metropolitan aqueduct distribution system runs through the 200-acre plant site. And, in addition, the site is immediately adjacent to the recently organized Chino Basin Municipal Water District.

Large Contract Awarded on Ross Power House

The Seattle Board of Public Works has awarded a $14,688,030 contract to the Guy F. Atkinson Co. of San Francisco for construction of the Ross power house on the Skagit River northeast of the city. The contract is the largest the city has awarded.

E. R. Hoffman, City Light superintendent, confirmed previous reports that the power house could not get into production until late 1953, instead of in late 1952, as originally had been planned. Three 90,000-kw generators will assume the added load placed on the system by the city's purchase of the Puget Sound Power & Light Co.'s Seattle distribution system.

The Ross power house is the latest unit of an expansion program which originally had been planned to cost $85,000,000 but now will exceed $100,000,000. Another contract, in the amount of $1,547,327, has been awarded to Smith & White of Seattle to build a transmission line from Bacon Creek on the Skagit to Seattle. This transmission line later will be extended from Bacon Creek to the Ross power house, thus completing the expansion program.

Sale of Eloy Power Co. to Arizona Edison Approved

Sale of the Eloy Power Co. to Arizona Edison Inc. for $263,944 has been approved by the Arizona Corporation Commission. The purchase includes property and distribution systems in Toltec, Picacho, and Red Rock, central Arizona towns in the Eloy district. Sole stockholder in the Eloy firm was Philip L. Coleman. The purchase increases Arizona Edison operations to 10 individual Arizona districts.

● **Bureau of Reclamation** expects to call bids shortly for the first major contract involved in construction of the $20,000,000 Eklutna hydroelectric project near Anchorage, Alaska. This contract, scheduled for award in May, involves a concrete-lined penstock tunnel 23,000 ft long.

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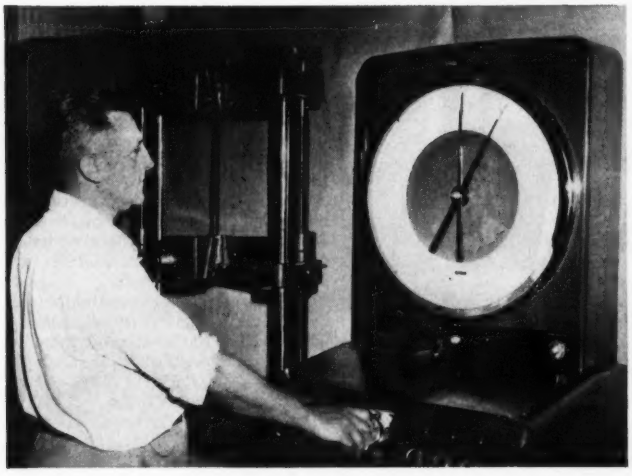

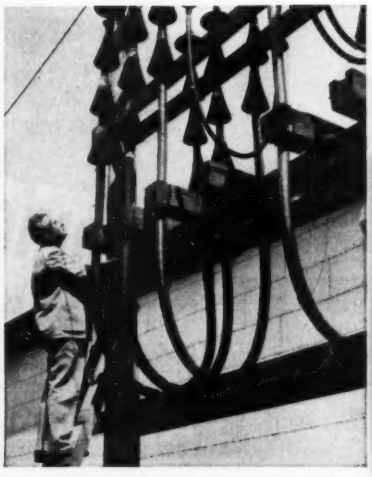

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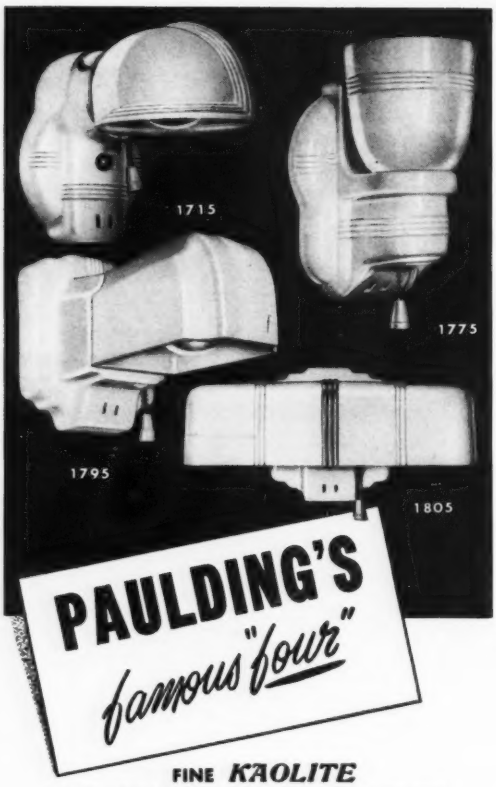

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McNARY CONTRACTS CALLED BY ARMY ENGINEERS

Bids for a $55,000,000 contract to complete the McNary Dam power house, spillway and abutments, were called by the Corps of Engineers for opening April 5 at Walla Walla, Wash.

Considered the largest single project to be offered for contract this year, the work will include excavation and construction of the substructure for a 12-unit section of the power house and superstructure for the entire power house, less turbine and generator floors for Units 9 to 14 inclusive. Completion is scheduled by Aug. 1, 1954.

Bids for constructing intake gates and appurtenances for the McNary Dam power house have been called by the Corps of Engineers, for opening April 17 at Walla Walla, Wash. One schedule will involve 45 gates and other mechanisms, the other 90 hydraulic cylinders. First of fourteen 70,000-kw units in the power house will go on the line late in 1953, according to present plans.

The power house eventually will have a total capacity of 980,000 kw, with the first 70,000-kw unit to go on the line in December 1953, and the 14th in 1957.

Davis Dam Reservoir Near Completion

Lake Mohave will reach its highest level by mid-May marking the completion of the Davis Dam reservoir. The lake started filling a year ago when releases of water from Davis Dam were curtailed. The reservoir extends 67 miles upstream to Hoover Dam and will contain about 1,700,000 acre-ft.

The Davis Dam project will be substantially completed this year, including the dam embankment, spillway, and power plant structures and some 1,500 miles of transmission lines.

Water is now being released through the first of Davis power plant's five 45,000-kw hydroelectric generating units. The spillway gates of the dam will be closed this spring when sufficient units have been installed to permit utilizing the full water release for generation. From then on it is expected that all the water released from Lake Mohave will be flowing through the power plant turbines, all of which are scheduled to be in operation by summer.

BIDS CALLED ON EKLUTNA TRANSMISSION LINE

Continuing preliminary construction of the $20,000,000 Eklutna hydroelectric project in Alaska, USBR has called bids for construction of a 115-kv transmission line 16 miles long from the site of the proposed power plant to Palmer, as well as a 12.47-kv line one mile long from the plant to the government camp. Bids were to be opened April 12 at Palmer.

The longer line will be a 3-phase, 60-cycle, single-circuit, 3-wire, wood-pole line designed for NESC heavy loading conditions. The conductors will be 397,500-cir mil ACSR with maximum tensions of about 50% of the ultimate strength. The ruling span will be 700 ft, with no conductor transpositions or overhead ground wires on this transmission line. Each pole of each structure will be provided with a ground wire.

Since much of the line is over muskeg, a peat bog overgrown with sphagnum mosses, special structure footings may be required. Two long spans, of 1,000 and 1,700 ft, will be required in crossing the Knik River. Completion will be required within 170 days.

Bids received March 1 for construction of housing, garages and utilities at the Eklutna government camp have been rejected as too high and new bids called for opening March 30.

New PG and E Line to Strengthen Service

Pacific Gas and Electric will invest $4,000,000 in a 110,000-v transmission line and three substations to provide additional electric power for Mendocino, Lake and Sonoma counties in northern California.

Preliminary work is scheduled to begin by mid-June. Power to these areas will come from the Pit River hydro plants in northeastern California. A 62-mile twin-circuit transmission line will be built from Williams on PG and E's north-south transmission system in the Sacramento Valley, west to Calpella, near Ukiah. From Calpella a 17-mile transmission line will be extended to Clear Lake. Substations will be built at Williams, Calpella and Upper Lake.

The project will strengthen service from Santa Rosa to Laytonville, a distance of about 100 miles. PG and E reports demand for power in the area has tripled in a decade.

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SPOKANE HEARING HELD ON KOOTENAI FLOOD CONTROL

Eighteen witnesses testified in favor of a proposed $270,000,000 power and flood control on the Kootenai River near Libby, Mont., at a hearing conducted in Spokane by the International Joint Commission. Further hearings were scheduled at Nelson and Cranbrook, B.C., and Helena, Mont.

The principal United States testimony was provided by members of the Seattle district office of the Corps of Engineers. Other witnesses included Brig. Gen. O. E. Walsh, North Pacific division engineer for the Corps of Engineers; Dr. Paul J. Raver, Bonneville Power administrator; Frank Banks, for the Bureau of Reclamation; Jack V. Rogers, director of the Washington State Department of Conservation and Development; Mark Kulp, Idaho reclamation engineer.

General Walsh told the committee the proposed dam would provide complete flood control for the Kootenai River and make 6,400,000 kw of electrical energy available annually, increasing Pacific Northwest power output by 30%. Since the river is a tributary of the Columbia, it would provide additional storage for Grand Coulee and other downstream power plants. The north Idaho panhandle has suffered millions of dollars in flood damage from the Kootenai.

Approval of the international commission is necessary since the dam would flood 17,700 acres extending 42 miles into Canada, as well as 33,800 acres in the United States. The commission has three Canadian and three U.S. members.

New Contracts Awarded on Rock Island Expansion

Two additional contracts have been awarded by the Chelan County PUD in its $26,000,000 expansion program at Rock Island Dam near Wenatchee, Wash., and bids have been called for more equipment.

General Electric Co., although it was underbid as much as $70,000 by two English firms, will furnish two 750,000-kva transformers for $483,339 and a 1,000-kva station service transformer for $6,296. The English Electric Co. bid $413,000 and the Ferranti Electric Co. $418,000 on the larger equipment, but specified delivery in 36 months as compared to 23 months for G-E.

Each of the bidders included a 20% maximum escalator clause in proposals for the larger contract, 10% maximum for the smaller.

Contracts totaling $7,341,000 previously had been awarded Allis-Chalmers for six hydraulic turbines and six 22,500-kw generators.

Bids will be opened March 26 for 13 compressed air circuit breakers of 1,500,000-kva interrupting capacity, complete with buses, disconnecting switches, instrument transformers and connections.

The Rock Island development will involve raising the height of the dam and installation of additional turbines and generators to increase the power output by some 150,000 kw.

Three-Man Committee to Study Power, Irrigation, Fish

Gov. Douglas McKay of Oregon has appointed a three-man committee which will attempt to iron out differences between power, irrigation, fish and game interests in relation to proposed power and irrigation development on the Deschutes River in central Oregon.

Members of the committee are: Arne Soumela, master fish warden; Charles Lockwood, state game director, and Charles E. Stricklin, state engineer. Chief problem facing the committee is construction of the proposed Pelton Dam, which fish and game men charge would be disastrous to the spring run of chinook and steelhead salmon.

● **Utah Power & Light Co. Has Faith in the Future** is the title of an attractive booklet published by that company to tell the story behind its new 44,000-kw Hale steam electric plant addition. "Yes, Utah Power & Light Co. has faith in the future—in fact, $61 million worth of faith," the booklet states and follows with pictures and copy on its expansion program, calculated to keep ahead of the area's electric power demands, in peace and war.

● **Using natural color photography** lavishly to illustrate it, San Diego Gas & Electric Co. has issued its 1950 annual report to stockholders. Interesting innovations are photographs in color of the directors and of the management council as well as one of an employees "How-are-we-doing?" meeting. The attractive folder was prepared under the direction of Forrest M. Raymond, advertising manager.

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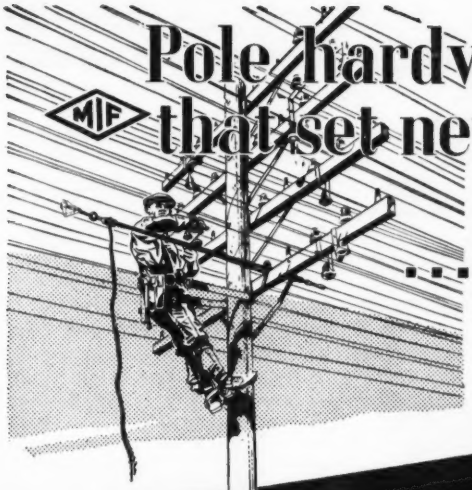

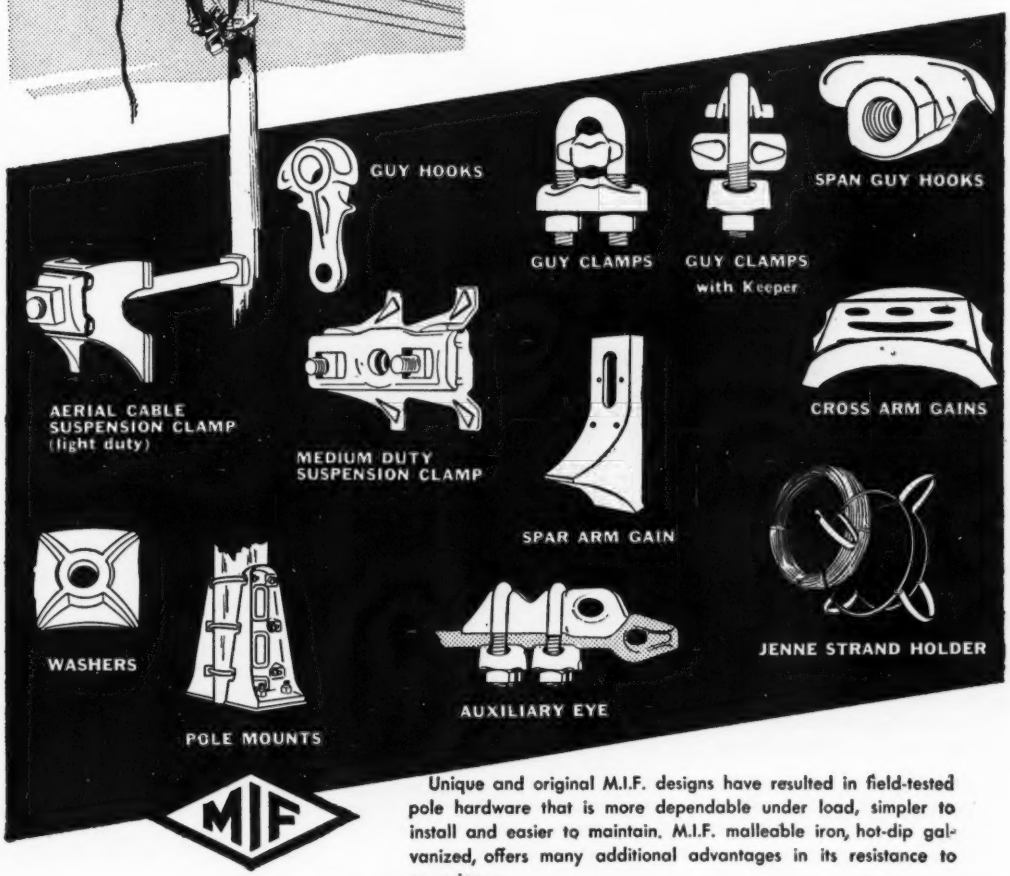

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POWER SALES ACCOUNT FOR $9,981,000 in CVP REVENUE

Income from sale of power accounted for about 92% of the total revenue of the Central Valley project during 1950 operations, according to the annual report released last month.

Gross operating income totaled $10,829,000 of which power revenue amounted to $9,981,000. Sale of water for irrigation, municipal, and industrial use brought in $847,565. Net operating revenue amounted to $8,602,000.

Pacific Gas and Electric Co. was the major buyer of CVP's power output, paying $9,909,342 for net energy amounting to 1,834 million kwh during the year. The CVP reports that its two plants, Shasta and Keswick, generated 1,882 million kwh last year.

Federal investment in the project by the end of 1950 was $340,000,000. Estimated cost of the project's authorized development as expanded by recent additions is $622,800,000.

Almost 90% of the total cost of the project will be repaid to the government by revenue from sale of power and water, the CVP report states. Power revenues will eventually pay for about 45% of the project and revenues from the sale of irrigation, municipal and industrial water, will pay for about 42%.

AEC Plans Further Expansion At Hanford Works, Richland

Further expansion of the Atomic Energy Commission's Hanford Works has been announced at Richland, Wash., by David F. Shaw, plant manager.

Under the $180,000,000 program formerly planned, work would have begun to taper off by the end of this year. Under the expanded program, construction employment will remain at its present level of 6,000 workers until at least mid-1952, Shaw said.

Rep. Henry M. Jackson of Washington, member of the joint congressional committee on atomic energy, said the revised program called for an additional expenditure of $25,000,000.

● **General office** of the Southern Colorado Power Co. in Pueblo is located at 115 W. Second St., in a newly remodeled 3-story building recently leased by the company. Meter and service departments will be at 210 W. 2nd St., in a company-owned building.

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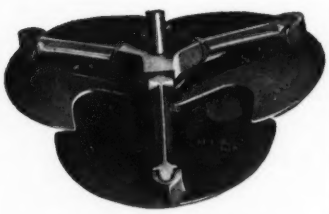

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GRAND COULEE BREAKER TESTS SATISFACTORY

Short circuit tests made March 18 at Grand Coulee switchyard on a 230-kv air-blast circuit breaker proved highly satisfactory. The Swiss-made Brown-Boveri breaker on trial interrupted 11,180 mva 3-phase equivalent in 2½ cycles on test, without visible sign of distress. On line dropping tests the breaker interrupted the charging current of 300 miles of 230-kv line without trace of restrike.

The tests were conducted by the Bureau of Reclamation in association with Brown-Boveri engineers and officials of the Bonneville Power Administration. It was the fifth in a series of tests on the 5,000,000-kva Northwest Power Pool to develop a circuit breaker of greater capacity and lower cost. Earlier tests made on General Electric, Westinghouse, Allis-Chalmers and Pacific Electric breakers resulted in circuit breakers of 10,000,000-kva rating. The recent tests were made with a desire to stimulate American manufacturers to investigate further development of circuit breakers employing some of the desirable characteristics of the air-blast type.

● **With the setting** of four 25½-ton sections for the 65,000-hp motor, work is proceeding on schedule for the start of operation about May 1 of the world's largest pump, which will lift water 280 ft above the lake behind Grand Coulee Dam into a storage reservoir for delivery next year to the Columbia Basin irrigation project. The four sections comprise the circular stator which General Electric Co. men are assembling under direction of Joseph A. Kadletz, supervising engineer. Pelton Water Wheel Co. of San Francisco and the Byron Jackson Co. of Los Angeles have the contract to furnish the pumps, for $1,150,675. General Electric Co. has an $858,153 contract for the first two motors, with the Westinghouse Electric Corp. to supply the next four for $1,617,350.

● **Vancouver** City Council has approved an ornamental street lighting system to cost $804,400. The lights will go on 13 trolley coach routes, two thoroughfares, and seven residential streets and will be paid for jointly by the B.C. Electric, the City of Vancouver and ratepayers if affected. City's share will be $314,400, taxpayers will contribute $392,140 and the B.C. Electric, $97,000.

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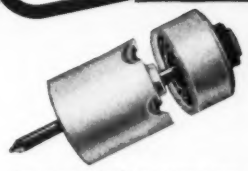

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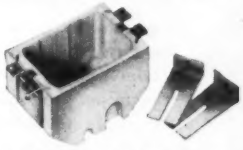

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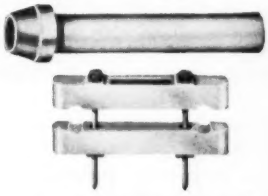

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POWER CUSTOMERS TO PAY FOR TRANSIT'S WAGE BOOST

Transit workers for B. C. Electric Co. have won a 16c-an-hour wage increase and the company's power customers are going to pay for it with an 11.2% increase in electricity rates.

This balancing-out of transportation deficits evolves from a policy approved by the provincial Public Utilities Commission whereby the BCE is directed to consider its three operations, transit, power and gas, as one unit for the purpose of determining its rate structures on the basis of allowable profit.

On this accounting basis, the company decided transit riders could not stand another fare boost (fares are now a straight 10c in Vancouver City) to meet the $2,130,000 total bill of the wage increase, and has applied to the PUC for higher power rates.

The BCE granted Street Railwaymen's union members in three cities —Vancouver, Victoria and New Westminster — a 12c-an-hour wage boost this year and another four cents in 1952 in a two-year contract.

The electrical rate increase will hit householders and light industry, not affecting commercial users.

Vancouver City was singled out for the greatest increase because it benefits most from the company's transit operations, and because it had a lower home power rate than the rest of the lower mainland. The boost will be to put the entire lower mainland on the same rate. Hitherto the initial Vancouver residential rate has been 4c per kwh, while the rest of the mainland area paid 5c. The new rate for Vancouver and surrounding areas is 5c for the first 60 kwh; 2c for the next 200 kwh; ¾c for the next 500 kwh; 1½c beyond that.

Salary Adjustments Follow Property Transfer at Seattle

Of the 390 employees acquired by Seattle City Light with Puget Sound Power & Light Co. properties, 244 received salary reductions, while 112 obtained increases and 34 received the same salary as before, the Municipal Civil Service Commission has reported to the city council.

Reductions not only outnumber the increases but they were in greater amount. Fifteeen persons received reductions of $5 a month and less, 58 from $5 to $20, 38 from $31 to $40, 24 from $41 to $60, six from $60 to $80, one from $81 to $95 and two from $131 to $135 a month. Largest cuts were taken by Puget Power supervisors for whom City Light had no vacancy or comparable position and thus had to take less important positions, usually clerical.

Of the increases, 43 ranged up to $5 a month, with 64 from $6 to $40 and three between $40 and $60, the commission reported.

Changes may be made in some of the classifications, the commission has indicated.

International Officers Take Over Seattle Local

International officers of the AFL Electrical Workers' Union have taken over management of Local 46 at Seattle, after six of the seven members of the local's executive board and its business agent had submitted their resignations. The local has jurisdiction over 2,200 inside electricians in most of western Washington as well as in the Aleutian Islands off Alaska.

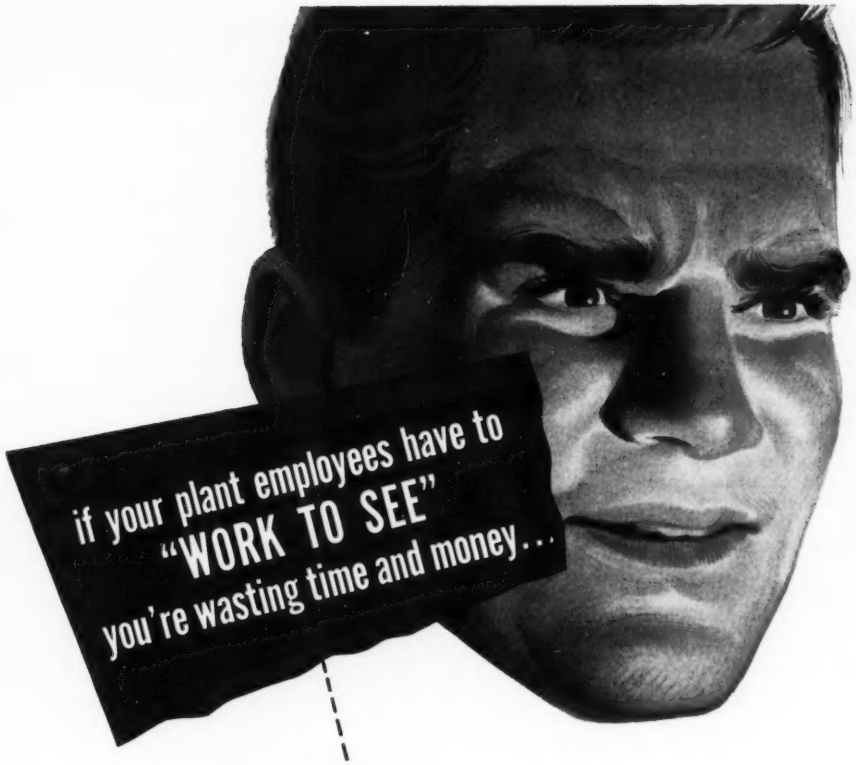
Gene Heiss, international vice-president, blamed lack of coordination among local officers for the move. Action had been slowed on vital craft contracts, he said. Heiss will manage the local pending a reorganization.

● **Overhead electrical workers** employed by the Seattle Transit System have been granted a wage increase of 4% plus 10c a day, bringing their hourly scale to $2.26¼. They are represented by Local 77, EWU.

● **Wage increases** have been given 288 employees of the Tucson Gas, Electric Light & Power Co. Monthly increases range from $4.25 to $23 a month. The increases were proposed by company representatives.

● **A full-color comic book** entitled *Having Fun With Kites* has been published by Pacific Gas and Electric Co. as its annual reminder to boys and girls and their parents that injury and possible death come when kites contact power lines. The books are circulated at schools and through city recreation departments. Copies are available from PG and E offices.

● **FPC** has issued a 50-year license to Denver, city and county, for construction and operation of a dam and reservoir on South Boulder Creek in Boulder County, Colo. The project is primarily for a municipal water supply with incidental power generation.



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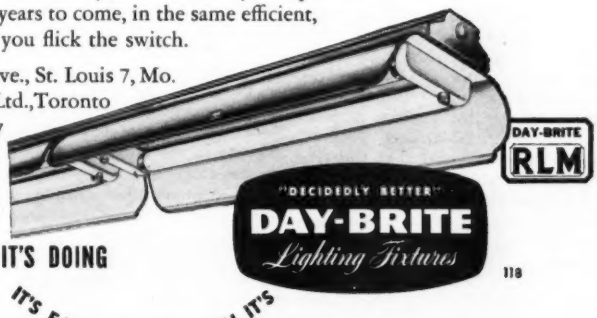

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CHAPMAN WILL PRESS FOR ALUMINUM EXPANSION

(From the McGraw-Hill Washington News Bureau)

Secretary of the Interior Oscar L. Chapman has overruled some of his private power industry advisers and decided to press for expansion of electric energy-using industry—notably aluminum—in the power-short Northwest.

Chapman's new policy was almost bluntly spelled out March 1 in two memoranda to his Defense Power Administrator, Clifford B. McManus, ex-president of Georgia Power Co. and the Southern Co. Immediate effect of the new statements was expected to be the early signing up of the Aluminum Co. of America for a new aluminum plant at a dam in Washington state. But the policies established by Chapman may have far-reaching implications for regional development as well as in the federal-private power fight in the Northwest.

In his "Power for Defense Industries" memorandum, Chapman told McManus that "In planning the expansion of defense industries, the location of which is dependent upon power supplies, it will be our basic assumption during the emergency period and until new capacity can be added that median or probable water conditions shall be used to determine the power resources available for new industrial expansion." Also to be considered in locating new high-power-load plants are new power plants under construction, which includes a vast program of power dams on the Columbia River.

This was Chapman's answer to private power officials now serving under McManus in the Defense Electric Power Administration, and other private power spokesmen, who have argued that there isn't enough power to support aluminum expansion on the Columbia. It flies in the face of an unwritten rule that firm power supply estimates for hydro-electric developments should be based on the lowest water year of record or at least a poor year.

In his "Power for Defense Industry in the Pacific Northwest" memorandum, Chapman said that the region has had median or better water in 20 of the past 26 years. "I am justified in assuming a calculated risk on power supply in the Pacific Northwest by approving expansion of defense industries based on power supplies available during the next few years under median-year water conditions," the Secretary held.

Ironically, the dispute that led to Chapman's decision arose over a dam owned by a private electric utility which is being gobbled up by federal and public power in Washington state, Puget Sound Power & Light Co. PSP & L's Rock Island Dam, near Wenatchee, Wash., now has an installed capacity of 60,000 kw, but there is space for adding new hydro units with a total additional capacity of 150,000 kw. Use of the undeveloped power at Rock Island for aluminum expansion was broached last fall by DEPA when it was headed by an acting administrator from the area, D. L. Marlett, assistant administrator of Interior's BPA.

Private power leaders on the staff of DEPA were somewhat less than enthusiastic about the idea. They pointed out that the Northwest could absorb the added 150,000 kw and a good deal more as it became available, without putting new load burdens on the area of the nation most seriously threatened by a power shortage. Other government officials were said to oppose aluminum expansion on the Columbia on the grounds that it would be strategically bad to concentrate more of the industry in that region, potentially accessible to attack from Soviet Asia.

Alcoa, however, was interested by the prospect of more cheap Columbia hydro power, and Interior's power planners urged the development of Rock Island.

The Rock Island project bogged down at first because PSP&L said it was not in a position to undertake the $25 million construction project. Then, Chelan County PUD, which may take possession of the dam under condemnation proceedings, agreed to lease the holes in the dam and install the power units. The lease provided that the PUD will sell the energy which it doesn't use on its own system back to PSP&L, so PSP&L thus is in a position to offer power to Alcoa.

Chapman's decision to encourage aluminum expansion in the Northwest meant that federal power officials believe that new war industry in the region will help their cause. It was encouraged, too, by Congressmen from the state, though some persons in the Northwest are critical of existing aluminum production. They contend that aluminum potlines hire relatively few people to produce a metal that is shipped to manufacturers in other areas. The Columbia's power might bring more prosperity to the area if harnessed to other industries, the argument runs.

In addition to Alcoa's four potlines, which either will be located at Rock Island or elsewhere on the Columbia on the basis of the additional firm power to be produced at Rock Island, Chapman's statement said other aluminum facilities may be economically located in the Pacific Northwest. The Alcoa lines are the last unlocated portion of the billion pound first expansion of the industry under the present mobilization. The next round's planning is certain to get new bids from the Northwest based on giant power projects now under construction.

Alcoa Negotiations Do Not Involve BPA, Raver Says

Negotiations by Aluminum Co. of America for power to serve a new 120,000-ton plant in the Pacific Northwest do not involve Bonneville power, Bonneville Administrator Paul J. Raver declared when asked concerning charges by Mayor De Lesseps S. Morrison of New Orleans that the secretary of the interior had offered "subsidized power" to Alcoa at half price. The charges were reported by Columnist David Lawrence.

Mayor Morrison was quoted as saying it was "pretty tough" to lose a $45 million plant for his city "because someone in government introduces a subsidy for another region."

The negotiations, Dr. Raver said, have been between Alcoa and Puget Sound Power & Light Co. and more recently with the Chelan County (Wash.) PUD. Whether the deal will be completed, according to Dr. Raver, will depend largely upon Chelan PUD's willingness and ability to develop an additional 180,000 kw of power at Rock Island Dam on the Columbia River and upon the kind of rate it can offer Alcoa.

Aluminum companies served by Bonneville pay a composite rate of 2.33 mills a kwh. Average rate of all Bonneville power sold to date is 2.44 mills, and the composite rate to all industries is 2.37 mills, while the composite rate to privately owned utilities is 2.41 mills.

Announced plans of the Chelan PUD call for addition of six generators at Rock Island dam which will produce an additional 150,000 kw of power. Tentative site for the proposed new Alcoa plant is near Wenatchee, Wash.

● **B.C. Power Commission** head offices have been moved into a new 4-story building in Victoria.

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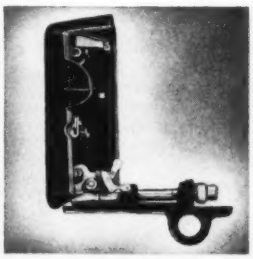
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By BERNARD GROB, Instructor, RCA Institutes, Inc. 592 pages, 6x9, over 400 tables, charts, illustrations, $6.50.

An A-to-Z manual for everyone concerned with TV receiver installation and servicing. You get a detailed picture of both AM and FM circuits, operation and servicing. Simplified drawings, schematic diagrams, photographs and circuit-block treatment give you clear explanations of every topic. Covered are timely subjects like—oscilloscope operation, intercarrier sound receivers, deflection circuits, projection systems, simultaneous and sequential color TV, etc. Trouble-shooting charts show symptoms, causes and cures for over 50 typical receiver problems.

2 POWER CAPACITORS

By R. E. MARBURY, Westinghouse Electric Corporation. 202 pages, 6x9, fully illustrated, $4.00.

A clear discussion of the design, manufacture and use of power capacitors and the benefits you can expect when you apply them to specific circuits and systems. This book assembles a wealth of useful data, covering capacitors for 60 cycle power circuits, high frequency capacitors for frequencies up to 12,000 cycles, capacitors for high voltage AC and DC circuits, etc. Accessories, operating limitations, applications, power factor, and automatic controls are discussed thoroughly.

3 MAINTENANCE MANUAL of ELECTRONIC CONTROL

Edited by ROBERT E. MILLER, Weller Manufacturing Company; 304 pages, 6x9, 200 illustrations and circuit diagrams, 16 charts, $5.00.

A practical installation, maintenance, and service manual covering: electronic relays and timing relays, photoelectric relays, electronic motor control, electronic resistance-welding control, electronic temperature control systems, and sealed-ignition rectifiers. This guidebook explains reading of diagrams, use of test equipment, handling and storage of apparatus, use and adaptation of the oscilloscope, etc.

4 ELECTRICAL ESTIMATING

By RAY ASHLEY, Research Engineer, Electrical Contractors' Assn. of City of Chicago; Technical Director, National Electrical Contractors' Assn. 307 pages, 6x9, illustrated. $7.50.

Here's down-to-earth information on every phase of electrical estimating—training estimators, forms, tools and their proper use, time studies, plans and specifications, checking material quantities, preparing final bid sheets, markups, etc. Guides and sample estimates of actual constructions, taken from recent cases, are included. Data are applicable to all types of electrical construction, includes industrial, commercial, institutional, transportation, etc.

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NOTES ON THE TRADE

● **General Electric** has established engineering and construction divisions in its Nucleonics Department at the Hanford Works, Richland, Wash., with **Ralph E. Davison** as manager and **John S. McMahan** assistant manager of the divisions. The divisions formerly were known as the project engineering, and design and construction divisions. Functions of the industrial engineering section of the project engineering division which pertain to the improvement of manufacturing methods will remain the responsibility of the manufacturing divisions.

● **Opening** of a West Coast parts department to supply Magnavox television, radio-phonograph and record changer components to Magnavox dealers and service agencies in Western states has been announced. **Major Gilbert** has been named warehouse manager for the new department, which has headquarters at 2424 E. 8th St., Los Angeles.

● **Novak & Atkin** Music Co., 534 Main St., El Centro, Calif., **Westbrooks,** 3750 Main St., Riverside, Calif., and **Danz** Music Co., 1985 5th Ave., San Diego, have been franchised to handle the Scott radio-phonograph-television line.

● Among new assignments made by Minneapolis - Honeywell Regulator Co. to the field staff of its Brown Instruments Division are: **Merle O. Evers** and **Ralph Brogie,** San Francisco; **Frank J. Stevens,** Los Angeles; **Robert R. Stalnaker,** Denver.

● **Appointment** of Nash-Kelvinator Sales Corp., 2819 Elliott Ave., Seattle, as Northwest distributor for Du Mont television receivers was announced last month. **Jack Burnett** will head up the new television division of the distributorship.

● **Petersen Engineering Co.** has moved its factory and offices to 460 Kifer Road, Santa Clara, Calif. Petersen is a line construction contractor and manufacturer of Pengo earth augers.

● **Boyd Engineering** Co. Inc., 718 N. Stanton St., El Paso, Texas, has been made a distributor of Mitchell window-type room air conditioners.

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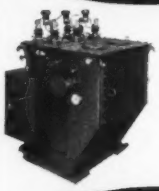

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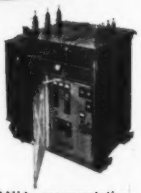
UNIT SUBSTATIONS



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It's time we got *working* mad!

As we listen to the latest insults from Moscow, we're likely to get fighting mad.

Instead, we'd better use our heads and get *working* mad.

It is clear by now that Stalin and his gang respect just one thing—strength. Behind the Iron Curtain they've been building a huge fighting machine while we were reducing ours. Now we must rebuild our defenses—*fast.*

As things stand today, there is just *one* way to prevent World War III. That is to re-arm—to become strong—and to stay that way!

This calls for better productivity all along the line. Not just in making guns, tanks and planes, but in turning out civilian goods, too.

Arms must come first. But we must produce arms *at the same time* we produce civilian goods.

We can do this double job if we all work together to turn out more for every hour we work—if we use our ingenuity to step up productivity.

All of us must now make sacrifices for the common good. But we're working for the biggest reward of all —*peace with freedom!*

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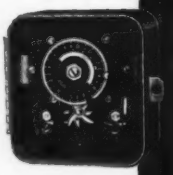

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● **Ricketts-Sewell Electric** Ltd. has organized a new electric heating division with offices at 4th Ave. W. and Granville St., Vancouver, B. C. Headquarters will still be maintained in its new building at 1169 Richards St., Vancouver. The company started in the installation and production of electric radiant heating panels a few months ago, and it is now found necessary to establish a separate division for these operations, it was stated.

● **Capital Wholesale Electric Co.** handling electrical supplies, lighting fixtures and a full line of pole line materials was recently organized in Sacramento by Clark Baker Jr. The new wholesale house is at 1235 S St., Sacramento. Baker, son of the late lighting educator, has had considerable wholesale experience as well as contracting in the Sacramento area.

● **Johnston Electric Co.,** 6436 Foothill Blvd., has been sold by Mrs. Johnston to the Foothill Electric Corp. owned by Kaiser Industries. **Robert Wright,** superintendent since the death of Mr. Johnston, remains with the concern.

● **Phil G. Kerr,** regional manager for Admiral Corp. in St. Louis and Davenport, will extend his operations to Denver. Kerr was a manufacturer's agent in Denver from 1938 to 1948. He replaces **P. G. Deluhery** as Admiral representative.

● **W. D. Evan Jr.,** Pacific Industries, 1046 S. Olive St., Los Angeles 15, has been appointed sales representative for Marcus Transformer Co. of Hillside, N.J. He succeeds Robert Young & Co.

● **Walter William Kirby** will be West Coast representative for Detjen electrocuting fly screens and traps. His address is P. O. Box 124, Vernon Branch, Los Angeles 58.

● **F. B. Connelly** Co. of Oregon has appointed **Tarlow Furniture** Co. as Hollywood district dealers for the complete line of Norge home appliances.

● **U.S. Rubber Co.** has named **D. H. Meissner** as head of its mechanical goods division in the San Francisco office. This division handles electrical tapes.

● **Fred W. Carlson,** electrical engineer and manufacturer's representative, recently moved from 307 Wall St. to 2307 Fifth Ave., Seattle.

NEWS ABOUT PEOPLE

● **S. W. Scott** has been made Graybar Pacific district manager with headquarters in Los Angeles. He succeeds **H. L. Harper,** who will retire in April after 19 years as Pacific manager. Harper will serve in an advisory capacity until his retirement. Scott joined Graybar 22 years ago as supply salesman; has been district sales manager since 1944. He is a native of Arizona, is a director of the Los Angeles Sales Executive Club and past president of the Los Angeles Electric Club.

● **T. C. Clarke,** who has been district manager for the Alberta and British Columbia Division of the Northern Electric Co. Ltd. since 1933, has been appointed general sales manager for the firm. He will be succeeded at Vancouver by C. E. Woolgar. Clarke's new appointment will necessitate his removal to Montreal head office.

● **Ralph B. Priestley** has been named Dean of the Division of Engineering, California State Polytechnic College, San Luis Obispo, as a further step in the administrative reorganization of the college. Priestley will have administrative responsibility for the electrical engineering department, as well as the seven other engineering departments.

● **D. M. Hitchcock** will be transferred by Graybar Electric Co. from San Francisco to Des Moines as branch manager. He has been in San Francisco since 1923 and at the time of transfer was supply department manager.

● **Howard G. Smith** has rejoined Resin Industries of Santa Barbara as vice-president. Smith was sales manager when he left in November 1948 to go with American Radiator & Standard Sanitary Corp. in San Francisco.

● **Fred Poynter** has been named field superintendent at Cut Bank for Montana Power Co., succeeding Jay Johnston who was transferred to Butte.

● **William T. Johnson,** Montana Power Co. statistician, retired March 1, after 38 years of service.

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—completely eliminate annoying blinking and flickering of dead fluorescent lamps!

REFLECTS THE CRAFTSMANS SKILL

GUARANTEED — FOR ONE YEAR!

This is a glow switch condenserless precision starter equipped with automatic thermal relay circuit breaker. The relay automatically removes the lamp from the circuit electrically when the lamp becomes deactivated and automatically resets upon interruption of the lamp circuit.

SIMPLIFIES—Replacement of defective lamp automatically recycles starter circuit. No buttons to push—no replacement of starter.

REDUCES COST—Magno-Tronic starters provide exact timing of electrode heating, preventing excessive loss of emission material, thus assuring maximum possible lamp life.

VERSATILE—Built to operate efficiently over an extended voltage and temperature range.

SP-15-20 For use with 15 or 20 watt lamps.

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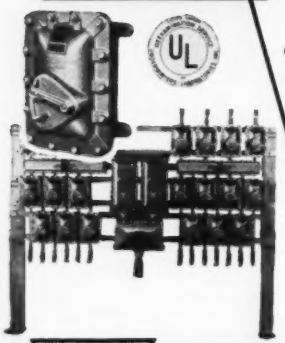
DUST-TIGHT
Class 1, Group D

Meet ALL Standards PLUS



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STAINLESS STEEL cover bolts . . . high strength enclosure with aluminum gray, corrosion resistant baked enamel finish.

FRONT ACCESSIBILITY permitting heaters to be installed or replaced without disturbing wiring or removing switch . . . abundant wiring space.

INDIVIDUAL UNITS and factory assembled panels of two or more units as illustrated . . . NEMA sizes 00 to 1 . . . also waterproof types.

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Staff Electrical Engineer seeks West Coast position with operating company or engineering firm. Twenty years administrative and technical experience eastern U.S. in all phases system planning and design, application of generation transmission distribution equipment. U. Calif. graduate.

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ELECTRIC EQUIPMENT CO.
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● **J. J. Mitchell,** vice-president of BullDog Electric Products Co. and formerly a Pacific Coast field engineer for Square D Co., has announced his retirement. As sales specialist with BullDog, he established national distribution of the company's products. He had been with BullDog since 1934.

● Appointment of **W. E. Guy,** former Graybar sales manager at Los Angeles, as assistant Chicago district manager was announced recently by the company. Guy was at Los Angeles before going to Chicago in 1944 to take the post of district sales manager.

● **Merrill Chitty** has resigned as head of the Chugach Electric Assn. at Anchorage, Alaska, after having held the position since Aug. 15. The REA group recently took over the Mountain View Power Co. at a cost of $71,000, thus doubling its size as a power distributor. It now serves some 2,000 homes in the Anchorage area.

● **Chester W. Schweers,** former Los Angeles manager for Allis-Chalmers, has been named director of sales for the company's general machinery division. He had been in the New England region since March 1950.

● **James C. Taugher** has been made meter and instrument specialist for the Pacific Northwest district of General Electric Co.'s apparatus department, according to J. R. Murphy, district manager.

● **W. M. Miller** of Oakland, Calif., who joined the General Electric Lamp Department at Oakland in 1916, has just been made manager of the Mattoon Lamp Works in Illinois for the G-E Co.

● **Gene McLennan** has been appointed city lighting superintendent at Port Angeles, Wash., after having filled that position in an acting capacity since the resignation of **J. J. McLean** Jan. 1.

● **C. E. Woolgar** has been appointed manager for the Northern Electric Co., at Vancouver, B. C. He was formerly wire and cable chief of the company's general sales division.

● **Electric Club of Oregon** heard Maj. Gen. Thomas M. Robins, USA, Ret., consulting engineer, in a discussion of the plans and possibilities for proposed hydroelectric plant on the Deschutes River at the March 22 meeting.

● **Present** Technical and Engineering and Construction divisions of the General Electric Co. at the Hanford Works operated near Richland, Wash., for the Atomic Energy Commission, were merged into a new major division April 2, with **Alden B. Greninger** as manager. It will be known as the Technical, Engineering and Construction divisions. **Oswald H. Greager,** present assistant manager, will succeed Greninger as manager of Technical divisions, with **Ralph E. Davison** to continue as manager of the Engineering and Construction divisions.

● **Harold Lynch** has been appointed assistant superintendent of the Baker River hydroelectric plant of the Puget Sound Power & Light Co. near Concrete, Wash., to succeed **Art Kramer,** transferred to the general office in Seattle. Lynch previously had been an electrician at the plant. An electrical engineering graduate of Seattle University, he was with the Boeing Airplane Co. before serving in the Air Force during the war. Kramer has become advertising director and editor of the company's publication.

● **Garth Griffiths** has been appointed deputy chief engineer of the British Columbia Power Commission. He was formerly superintendent of the coastal region, at Nanaimo. His new headquarters will be at Victoria. Before joining the Power Commission after the last war, he served for a time with the American Appraisal Company on B.C. Power Commission evaluation studies.

● **T. M. C. Martin** has been made director of Bonneville Power Administration's safety program, replacing **Scott W. Hazen Jr.,** who is transferring to the U. S. Bureau of Mines, Denver, as assistant district engineer. Martin has been with Bonneville since 1940 as electrical engineer and transportation specialist.

● **Francis K. McCune** has been named manager of engineering of the General Electric Co.'s large apparatus division. He formerly was assistant general manager of the company's Nucleonics department with headquarters at Richland and is a native of Santa Barbara. **William E. Johnson** succeeds him at Richland.

● **J. Harold Hughes,** attorney, is the new chairman of the Hawaii public utilities commission, succeeding **James M. O'Dowda,** who is retiring because of ill health.

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$65,000.00 ELECTRICAL SUPPLIES

COMPLETE STOCK OF VERY DESIRABLE MATERIALS

OF THE **CURTIS ELECTRIC CO.** ELECTRICAL CONTRACTORS

TO BE SOLD **TUESDAY, APRIL 24TH** STARTING AT **10 A. M.**

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LARGE QUANTITIES OF FOLLOWING ITEMS

Galvanized Conduit ½" to 5" — E.M.T. ½" to 2 .
Complete Stock of Elbows, Couplings, Nipples, Condulets, Locknuts, Bushings, All Fittings, Etc., Etc. All Sizes. Assorted.

WIRE T.W.—T.F.—R.C.—A.F.—R.R.—R & L—5KV CABLE—V.C.L. (All sizes from 19/2 to 350 M.C.M.)
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12,500 ELECTRIC OUTLET BOXES FROM 3¼" to 4 11/16"
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SERVICE MATERIALS

Meter Bases—Service Switches—Combination Panels—Panellets—Main-Range Pullouts with Branch Circuits and
OTHER MISCELLANEOUS ELECTRIC EQUIPMENT

SWITCHES

Standard Single Pole—3 Ways—Despard Line of Switches and Plates

RECEPTACLES Single, Duplex and Utility—Twist Lock—Cord Connector Bodies, Receptacles and Caps

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● **Ansbert G. Skina,** Idaho electrical engineer who directed the rebuilding of the West Berlin power plant during the American airlift into Germany, has been appointed chief of the construction expediting branch of the Defense Power Administration. A native of Wallace, Idaho, Skina is a graduate of the University of Idaho. He served as an electrical engineer with the Bunker Hill and Sullivan Mining and Concentrating Co., Kellogg, Idaho, for seven years until he was called to active duty with the Army in 1942. During the war, Skina served as a major in the Signal Corps in the U. S. and the European Theater. In September 1947, he was transferred to the Public Utilities Branch of the Office of Military Government in Germany. In November 1948 Skina was assigned the task of rebuilding the 100,000-kw "Berlin West" power plant which had been stripped by the Russians. Equipment for the project had to be brought in by plane during the Russian blockade. Skina went to Interior last September and helped organize the Defense Power Administration.

● **H. E. "Herb" Sladen,** formerly distribution engineer for the B. E. Electric Fraser Valley district, has been appointed distribution engineer in charge of the Greater Vancouver and Fraser Valley districts. He has moved from Abbotsford to the B. C. Electric's head office in Vancouver. Replacing Sladen, who has worked in the Fraser Valley for the past four years, is **A. J. "Allix" Duncan,** formerly district distribution designer at Abbotsford for four years. **Walter Marks,** formerly distribution designer at Abbotsford, has been appointed to replace Duncan. **F. J. Otte,** for five years a radar instructor with the RCAF during the war, has been named distribution designer at Abbotsford. Serving the B. C. Electric Co.'s Fraser Canyon district will be **John O. Dueckman,** who has been appointed distribution designer with offices in Abbotsford.

● **L. H. Miller,** city electrician, Vancouver, B. C., and Earl Dunsmuir, Dunsmuir Electric, Vancouver, B. C., have been named as two of the representatives on the board of examiners to be appointed by the B. C. government for the issuance of certificates of competency for electrical contractors in B. C. Miller has been named to represent the Electrical Inspectors' Assn. of B. C. on the board. Dunsmuir has been selected by the Vancouver Electrical Assn. to represent their members.

Deaths

● **Frank A. Hansen,** creator and director of the Western Institute of Light and Vision, succumbed to a long illness March 9 at his home in Los Angeles. Having made lighting his life, he did more to influence its progress than anyone in the West in the industry. Born in Mineral, Idaho, 1899, after service in the Navy in World War I he was field engineer for the Holophane Co. until 1933. In 1934 he founded the Western Institute of Light and Vision from which he published booklets, *Seeing* and *Your Home,* that have been used in large quantities as educational pamphlets by the utilities and schools throughout the United States and in several foreign countries. He influenced the Illuminating Engineering Society to set up regional vice-presidents for the United States, initiated the first regional conference in Los Angeles, served as regional vice-president of the society from 1940 to 1942, became a Fellow in the society and was made member emeritus at the Pasadena convention last September. He was awarded the honorary degree of Master of Science by the University of Southern California in 1942. He was also a member of the American Institute of Electrical Engineers and the American Legion. During World War II he was made director of light control for the office of civilian defense and, with illuminating engineers from the various utility companies on the Western frontier, authored dimout and blackout regulations for the Coast based on sound illuminating engineering principles.

● **Stanley Challoner Fawcus,** 65, cable system designer for the B. C. Electric Co. at Vancouver, B. C., died suddenly one day following his retirement from the company. He joined the organization 39 years ago, and officially retired at the end of 1950, but agreed, due to pressure of heavy work, to continue until March. He died of a heart attack on his way to the office. Mr. Fawcus was born in Newcastle, England, and went to Canada in 1910. He served overseas with the 29th Battalion during the first world war.

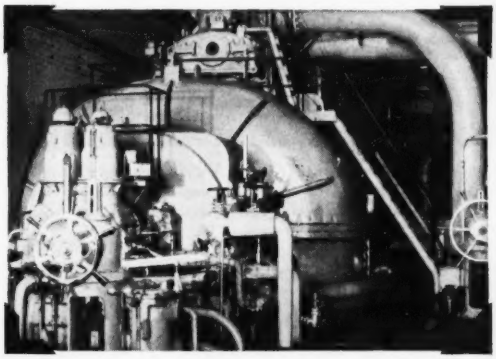
● **John Bright Parham,** electrical engineer of Vancouver, B. C., died at his home there recently. He was born in Ontario and in 1900 enlisted in the Fifth Royal Scots in Montreal. In 1902 he went to the Boer War with the Canadian Mounted Rifles.

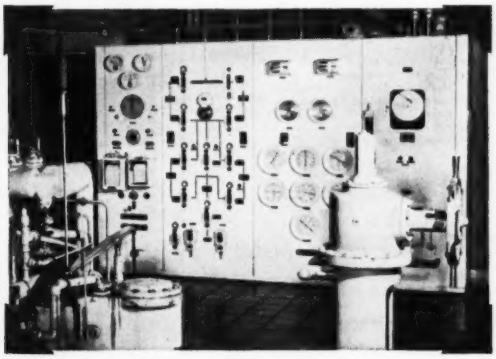
STANDARD ENGINEER'S REPORT

DATA

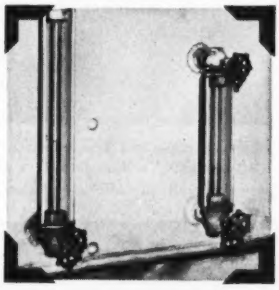
LUBRICANT	Calol OC Turbine Oil-9
UNIT	G.E. 50,000 KW Steam turbine Horizontal steeple compound Steam 1250 lbs - 750°F.
PERIOD	6½ years
LOCATION	Station A, San Francisco
FIRM	Pacific Gas + Electric Co.

Oil charge in use 54,000 hours shows no deterioration!

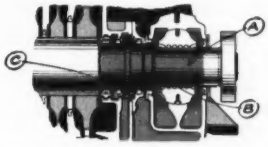




CHARGED WITH CALOL OC TURBINE OIL more than 6 years ago, this turbine-generator has operated continuously for 54,000 hours without re-charging. The oil still filters clear. (Note clearness of oil in filter sight gauges below.) Laboratory analyses show no increase in acidity. Oil lines, sump, and governor-control mechanism are clean and free of sludge and lacquer. Journals indicate no wear. Calol OC Turbine Oil provides a constant lubricating film and is very resistant to both oxidation and corrosion. It will solve your toughest lubrication problems in turbines, hydraulic units, pumps, etc. It comes in several grades to meet many different operating conditions.



How CALOL OC Turbine Oil prevents sludging, rusting and wear



A. Excellent metal-wetting ability keeps CALOL OC Turbine Oil on bearings and gears under the heaviest loads—assures constant lubrication.

B. Oxidation inhibitor resists highest operating temperatures; prevents sludge, gum and lacquer formation on parts and in oil systems.

C. Corrosion inhibitor stops rusting even in initial turbine operation, stops the action of both fresh and salt water.

FREE CATALOG: "How to Save Money on Equipment Operation," a new booklet full of valuable information, is ready for you. Write or ask for your free copy today.

CALOL

TRADEMARK "CALOL" REG. U.S. PAT. OFF.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

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PROFILES

Among the first in the West to see the General Electric "More Power to America" train were the board of directors of the PCEA, while meeting in Phoenix. President Frank Tracy is in the cab, other officers ascending the stairs followed by a crowd

E. M. Ellis, manager of the G-E apparatus department at Los Angeles, presents the Coffin award for 1950 to Wayne Allen, Wilson Davidson and James Chilson for their work in establishing and operating an aircraft gas turbine repair shop at South Gate

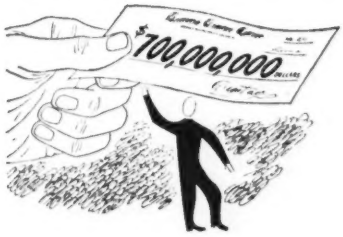
Officials of Puget Sound Power & Light and city of Seattle sign papers transferring the company's Seattle properties to the city. Attorney L. P. Mickelwait (far side of table) signs for the company; W. C. Thomas, city comptroller (back to camera) for the city

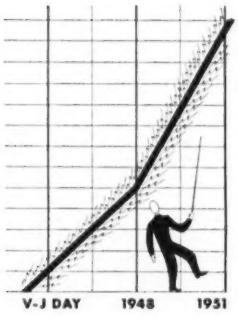
THE CALIFORNIA POWER STORY

P. G. and E. power network now 55,500 miles long

12,200 miles of new P. G. and E. transmission and distribution lines have been strung in Northern and Central California since V-J Day, bringing total mileage to 55,500.

This is just part of P. G. and E.'s postwar expansion which is the largest in history. Already it has created new power facilities worth seven hundred million dollars—or an average of over $530 for every electric customer.





By summer, this huge power-building program will have doubled the horsepower available to the homes, farms and factories in Northern and Central California. The 1951 capacity will be four million horsepower—at rates among the lowest in the nation.

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

48X-51

Something to sell...*all the time!*

More and more, electrical appliance dealers are finding it good for business to "sell" Certified Adequate Wiring along with every appliance . . . and to keep "selling" it even when appliances are scarce.

It's logical, too. The merchandise situation gets into a state of unbalance, every now and again, but the need for adequate electrical service facilities in every home keeps right on growing, every year.

Remember this: When there *are* new appliances to sell, Certified Adequate Wiring helps sell them—and helps *keep* them sold by assuring satisfactory performance!

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